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RESEARCH REPORT

Who Are the High Cost Cases in a Health Benefits Plan?

Leslie M. Alexandre

May 1988

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Report 88-1

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international foundation of employee benefit plans
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About This Report

The research documented in this report was performed under the Grants for Research Program of the International Foundation of Employee Benefit Plans. The purpose of the program is to encourage graduate students and professional researchers to pursue the study of issues and problems having legal, economic, social or political consequences for the private employee benefits field.

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Section I

Research Overview

In 1984, 1,666 members of the group medical plan upon which this research was based spent $21.8 million on medical care services. Comprising fewer than 6% of all claimants, these "high cost patients" were responsible for more than 55% of total plan expenditures. The most expensive 40 claimants in 1984 (0.14% of all claimants) collectively spent almost $4.5 million on medical care—11.5% of total plan expenditures.

Although dramatic, these statistics are not dissimilar to those that have been presented in other recent analyses of claims from employment-related group medical plans. For example, the most expensive 40 patients in a medical plan of 9,200 members were reported to have been responsible for 16% of the entire group's medical expense from October 1982 through December 1983 (Rosenbloom and Gertman, 1984).

Because of their enormous impact on total plan expenses, and relatively small number, the high cost patients are an attractive target for private sector health care cost management efforts. However, the degree to which the utilization and expenses of the high cost patients in employer-sponsored medical plans can be controlled is presently undetermined, largely because the medical experience of these patients has not been studied in a systematic and comprehensive manner. Lacking are data on the health problems suffered by these individuals; their sociodemographic composition relative to other plan members; how they use services; and their expenses and utilization over a period of years. Without this type of information, employers are at a loss as to the mix of programs that should be implemented to prevent or ameliorate high cost cases.

The void of knowledge concerning high cost patients was the stimulus for this research. This investigation characterized high cost patients in the fee-for-service medical plan of one of the nation's largest financial institutions. High cost patients were described in terms of their age, sex and dependent mix (employees vs. spouses vs. children); temporal expenditures and utilization rates; and most frequent diagnoses.

Section II

Employers and Health Care Cost Containment

Over the past decade, employers have undergone an important transition in the nature of their interaction with the health care delivery system. Prior to the mid-1970s, when some companies began to perceive rising employee health care costs as a threat to profitability and competitive posture, the role of the employer was voluntarily confined to that of passive payer for services via job-related health insurance. Ten years later, shocked into action by medical plan expenses that have escalated at a rate far exceeding most other costs of doing business, many large employers are striving to exert their influence over the manner in which health care services are sought, delivered and financed.

As the largest private payer of health care services, and the source of revenue currently most desired by providers of these services, employers have considerable leverage in the health care system. Employers pay 75% of all private health insurance premiums (Arnett, Cowell, Davidoff & Freeland, 1985). When contributions to the Medicare Hospital Insurance Trust Fund, workers' compensation and compulsory temporary disability insurance are added to the equation, employers pay at least 30% to 35% of all personal health care expenditures. This amounted to between $111 billion and $130 billion in 1985, or $451 to $526 per capita for the entire United States population (Waldo, Levit & Lazenby, 1986).

Employers have strong motivation to exploit their purchasing power in the health care system. In the span of only ten years, employer contributions to private health insurance (including self-funded plans, "administrative services only" arrangements, minimum premium plans and health maintenance organizations, as well as fully insured plans) more than quadrupled from $18 billion in 1973 to $82 billion in 1983, an average annual increase of 16% (Arnett *et al.*, 1985). During the same period, employer contributions to health insurance plans nearly doubled as a percentage of total employee compensation. In the absence of sweeping changes, such as the initiation of a national all-payer prospective reimbursement system, employers' 1990 bill for employee health insurance is expected to be $155 billion (Arnett *et al.*, 1985).

Early Efforts

Private sector initiatives to combat rising health care costs began during the 1970s, but overall these early attempts at cost containment were not dramatic. In part, this may have been due to the fact that the sponsors of employment-related health insurance plans (i.e., employers, unions, multiple employer trusts, etc.) had to undergo an education about health care before taking action. Prior to initiating changes, these sponsors needed to understand the causes and consequences of employee ill health; the reasons for rising health care costs; how the health care delivery system is organized; and potential methods for reducing employee health expenditures without limiting access or diminishing the quality of services provided.

Concerns regarding access and quality, plus tremendous uncertainty as to how employees would

respond to perceived cutbacks in the "favorite benefit," led employers to move cautiously in their early efforts to control costs. Additional deterrents to imposing major changes were the absence of objective evidence validating the effectiveness of proposed cost containment strategies (Whitted & Torrens, 1985) and the desire by many employers to assure that their benefits packages remained competitive for purposes of recruiting and retaining key employees (Fielding, 1984a; Sapolsky, Altman, Greene & Moore, 1981). Untested liability issues related to employers influencing insureds' use (or nonuse) of particular health care services may also have been a barrier to change.

As a result of these considerations, employers' initial cost containment endeavors typically did not venture into the sensitive area of patient-provider relationships. Instead of trying to influence the types of services sought by employees or the manner in which these services were delivered, employers acted to curb health care expenditures in ways that were either transparent to employees or that would not be perceived as benefit takeaways. In the mid to late 1970s, for example, many large employers converted their fully insured medical plans to plans that were either partially or fully self-funded to eliminate state premium taxes and to earn interest income on plan reserves (Egdahl & Walsh, 1979; Fielding, 1984a; Herzlinger & Schwartz, 1985; Whitted & Torrens, 1985). Some also brought the claims processing function in-house to gain tighter control over the administration of their health plan and to improve system efficiency (Fielding, 1984a; Stokehold, 1979). Ceasing to be insured and/or "administered" in the traditional sense usually permitted employers to exercise greater control in the design of their health plan, e.g., services and providers covered; benefit levels; provider reimbursement; etc. However, few employers immediately took advantage of these additional cost management opportunities afforded by self-insurance.

With the exce,ption of second surgical opinion programs that were almost always voluntary, private sector programs aimed at reducing medically unnecessary and inappropriate services were uncommon at this time. Benefits for nontraditional, potentially lower cost alternative services and providers, such as home health care services and hospice, were also unusual. While most large employers offered their employees the option of joining a health maintenance organization (HMO), they often did so because of federal "dual choice" regulations rather than a strong belief in the cost effectiveness of care provided on a prepaid basis.

Employers' ambivalence about HMOs was reflected in responses to the Louis Harris and Associates survey of employer attitudes concerning HMOs conducted on behalf of the Henry J. Kaiser Family Foundation in 1980. Nearly 1,000 executives in 634 companies located in the 50 metropolitan areas served by HMOs at that time were interviewed. Two-thirds of the benefits officers and 54% of the chief executive officers (CEOs) questioned believed that HMOs were somewhat effective in containing costs. However, about half of the CEOs felt that the emphasis HMOs place on cost control measures could lead them to sacrifice the quality of care which they offer. Almost two-thirds of all executives with experience in offering HMOs did not believe that HMOs affected (positively or negatively) the costs of health care to their organization (Louis Harris and Associates, 1980).

A number of purchaser-sponsored health care coalitions began to form at the local level during the late 1970s (Goldbeck, 1984), but their initial efforts were aimed primarily at education and information sharing. With rare exceptions, it was not until a few years later that employers began to use their participation in coalitions to exert a collective influence on government representatives and the provider community in matters pertaining to the financing and delivery of health care services (Bergthold, 1986; Longest, 1985).

Recent Endeavors

Prompted by annual rates of increase in health insurance premiums frequently on the order of 20% or higher (Herzlinger & Schwartz, 1985), private sector actions to moderate health care costs intensified and accelerated rapidly during the first half of the 1980s. In just two years, for example, the number of health care coalitions listed in the Chamber of Commerce's Clearinghouse on Business Coalitions more than doubled, from 45 in 1981 to 105 in 1983. Over half of the coalitions listed in 1983 were comprised exclusively of purchasers. Business coalitions in the 1980s are addressing a much broader set of agenda items, including: benefit design; managed care systems (i.e., HMOs and

preferred provider organizations, and hybrids thereof); health education (including self-education about health care cost issues); data collection and analysis to guide cost containment activities; health planning; trustee education; and utilization review (Goldbeck, 1984).

There are many other positive indications of greater employer involvement with health care cost control. Regular national surveys of employers by Hay Associates, the Health Research Institute and the Department of Labor, plus ad hoc surveys by the insurance industry, major employee benefits consulting firms and various health care coalitions, continue to document the swift pace at which employers are changing their health plans and adopting new cost management strategies. In 1985, on behalf of the Equitable Life Assurance Society, Louis Harris and Associates conducted an in-depth national telephone survey of 1,250 corporate benefits officers, 200 senior executives and 200 human resources executives of corporations with more than 500 employees. More than 70% of the employers indicated that they had changed their health plans to control costs somewhat or a great deal over the last three years, and an equal proportion anticipated making the same amount or more changes over the next three years (Louis Harris and Associates, 1985a).

Not only are more employers venturing into the fray of health care cost containment, they are attempting methods of cost control that only a few years ago were either unheard of or perhaps considered too extreme. To begin with, the above surveys and others indicate that more large employers are redesigning their health plans to encourage cost conscious purchasing decisions by employees and their families. This is accomplished through increased cost sharing (i.e., deductibles, coinsurance, etc.); positive or negative incentives for more appropriate use of health care services (e.g., 100% reimbursement for outpatient surgery, or 60% reimbursement for inpatient surgery that could have been performed safely on an outpatient basis); and coverage for a broad range of lower cost alternative services and providers (e.g., outpatient treatment for alcoholism and other chemical dependency, birthing centers, etc.). Second surgical opinion programs are increasingly mandatory (Health Research Institute, 1986), with specific criteria for who may furnish the second opinion. In some plans, full benefits for the operation are not provided unless a second or third opinion confirms the need for surgery.

Before 1980, very few companies had implemented any sort of utilization review (UR) program, particularly one that would require employees to obtain prior authorization for elective hospitalization in order to receive full benefit payment under the plan. Now such programs are common among large employers (Health Research Institute, 1986), and the term "UR" frequently connotes a much broader range of utilization management activities than five years ago, when government-sponsored Professional Standard Review Organizations (PSROs) provided nearly all hospital UR services to both the public and private sectors. Dozens of private review organizations throughout the country currently provide employers and other group medical plan sponsors with UR services, including preadmission and continuing stay review; management of second surgical opinions; discharge planning; retrospective audit of the hospital bill; profile analysis of individual provider utilization patterns; and an assortment of other related functions.

A few years ago, employers were often hesitant to communicate with employees about health care costs, their impact on the company and steps being taken to control these expenditures. Today, many employers are investing significant resources in large scale communication programs designed to educate insureds about these issues and to motivate them to take steps to improve their health and to use the health care system wisely (Alexandre & Barter, 1985; O'Donnell, 1985; Stone, 1986). By teaching employees how to be better health care consumers (e.g., how to choose a physician; appropriate use of hospital emergency rooms; use of generic drugs; self-care for minor medical problems; etc.), employers are attempting to prevent unnecessary encounters with the health care system and to improve the efficiency and quality of those that are medically needed.

Negotiation of charges with hospitals and physicians is another example of how employers are exerting their influence over the health care delivery system (Herzlinger, 1985; Lipschultz, Scanlon & Brunner, 1984; Sapolsky *et al.*, 1981). By structuring benefit levels to reward the use of a particular set of providers, employers are steering their insureds toward providers that have been deemed to be more

cost effective (or otherwise more preferable) than other providers in the community. The level of savings from this approach is difficult to measure and has not been well established. Nonetheless, contracting with providers, either directly or through a preferred provider organization, is being implemented by a growing number of employers (Cole, 1986; Fox & Spies, 1984).

Enrollment in HMOs has increased dramatically in the past few years, in large measure due to the tremendous growth in the number of these organizations. At the end of 1984, there were 337 HMOs serving about 17 million members in 43 states (InterStudy, 1985). Just one year later, there were 480 HMOs serving 21 million enrollees in all 50 states (InterStudy, 1986). Greater acceptance of HMOs on the part of corporate executives undoubtedly has made an important contribution to the growth of membership in HMOs. A recent update by Louis Harris and Associates of its 1980 survey of employer attitudes toward HMOs found that between 1980 and 1984 the percentage of executives reporting that HMOs decreased their health care costs rose from 13% to 30%; the percentage reporting that HMOs increased their costs declined from 14% to 8%. Overall, 85% of the executives believed that HMOs could help contain costs (Louis Harris and Associates, 1985b).

Despite their more favorable position on HMOs, employers still have serious questions about the cost effectiveness of these organizations. Many employers are concerned that when offered a choice between enrollment in an HMO or membership in the company's fee-for-service medical plan, it is the younger, healthier employees that tend to join the HMO. Recent studies suggest that this type of adverse selection may well be occurring (Buchanan & Cretin, 1986; Jackson-Beeck & Kleinman, 1983), although historically the evidence regarding this issue is mixed.

Apparently undaunted by the lack of definitive answers to the adverse selection question and others concerning HMOs, many employers have aggressively pursued HMO enrollment by their employees as a cost control approach. Some companies, such as R. J. Reynolds, Deere and Company and Caterpillar, have actually started their own HMOs (Whitted & Torrens, 1985). In other cases, groups of employers have banded together to stimulate the development of HMOs in their communities (Longest, 1985). At least one company, Lockheed Corp., has gone so far as to require HMO enrollment for new employees for a period of one year (Whitted & Torrens, 1985).

Influencing Factors

This dramatic turnaround in employers' willingness to impose themselves directly on the health care delivery system has been facilitated by several factors. First, employers are much more knowledgeable about the health care system than they were several years ago, and most have had at least some practice in trying to control their health care costs. Years of public and private sector experience with a broad assortment of cost containment approaches have demonstrated that national health care costs cannot be brought under control systemwide without effecting major changes in the financing and delivery of health care services. Sophisticated employers recognize that actions taken by the government to control spiraling Medicaid and Medicare costs, particularly Medicare reimbursement based on diagnostic related groups (DRGs), are likely to promote greater cost shifting to the private sector if strong preventive measures are not implemented. While some employers lobby for prospective payment systems in their states (Fielding, 1984a; Herzlinger, 1985), others prefer to step up the cost containment features of their own health plans rather than pursue a regulatory approach.

Employers also have been encouraged to be more assertive in their attempts to control costs by employees' high level of acceptance of the actions taken thus far. The 1985 Louis Harris survey of corporate initiatives to control health care costs referred to earlier also interviewed a national cross section of 1,253 employees in firms with 500 or more employees about their attitudes toward these initiatives. Employees were asked to indicate the acceptability of each of 17 different changes employers can make to control their costs. With the exception of five changes involving greater cost sharing, 73% to 98% of employees whose employers had made a change found it to be very or somewhat acceptable. Increased coinsurance, the least acceptable of all 17 changes, was still somewhat or very acceptable to half of the employees affected by the change. The extremely high level of acceptance for some changes, including financial incentives to en-

courage employees to practice health and safety procedures; health promotion programs; medical and disability case management systems; and flexible benefits programs, suggests that employees perceive these changes as benefit enhancements rather than constraints (Louis Harris and Associates, 1985a).

For a growing number of companies, the identification of specific, ameliorable problems in the health plan through detailed analyses of claims data has triggered more aggressive interventions. Many utilization review programs, for example, have been the result of employers discovering that the hospitalization rate for their plan is much higher than expected given the characteristics of their covered population. Direct price negotiation with competing hospitals has been facilitated by the analysis of charges for specific inpatient services (Segal, 1984). Increasingly, these analyses are being adjusted to account for the relative severity of illness among insureds hospitalized at these institutions.

Claims Analysis

The ability to analyze claims data and produce useful management information about a plan's expense and utilization experience has been a significant advancement for employers in their battle against rising health care costs. Understanding the nature and source(s) of expense and utilization problems in their plans gives employers greater confidence that the actions they are taking to control costs are necessary and appropriate. This level of information also permits employers to focus their cost management resources on targets that are apt to yield the best return on investment, an important consideration when faced with a growing array of cost control options.

The caliber of claims data available for analysis is generally improving due to mounting pressures on insurance carriers and third party administrators to capture more complete and accurate information from the claim form (Whitted & Torrens, 1985). Most carriers, however, have been slow to develop the internal system capabilities and health care expertise necessary to convert these data into the types of management information employers are demanding for cost control purposes (Walsh, 1980). The Health Research Institute's 1983 Health Care Cost Containment Survey, responded to by 602 of the nation's largest 1,500 companies, found that employers' highest priority medical cost management actions were to gain accurate data and to analyze health care costs. Few employers, however, reported success in obtaining data on the cost and utilization experience of their health plan (Health Research Institute, 1983). Another 1983 cost containment survey found that out of 22 services commonly provided by insurance carriers, 300 corporate respondents rated management information as the second most important. These employers reported being *very* dissatisfied with the level of cost and utilization data provided by their carriers (Spencer and Associates, 1985).

Failure of carriers and administrators to satisfactorily meet the information demands of their clients has prompted many of the major health insurance brokerages and benefits consulting firms to expand and improve on their data analysis capabilities. It has also spawned the development of several health care cost containment vendors specializing in the analysis of claims data. In a number of cases, insurance carriers have combined forces, either through acquisitions or joint ventures, with one of these data analysis vendors to improve the quality of management reports available to clients (Webber & Goldbeck, 1984).

Employers unable to obtain desired information directly from their carriers are increasingly providing computerized tapes of their plan's experience to a broker, consultant or cost containment vendor for analysis. In addition, many local health care coalitions are participating in joint data projects, whereby member companies submit their claims tapes to a data analysis vendor and subsequently receive reports detailing their plan's experience compared with the aggregate experience of all participating companies (Shiver, 1986; Taravella, 1986).

High Cost Patients

With the growth in new opportunities for obtaining management information, more employers are undertaking micro level data analyses of their plans' experiences to guide, evaluate and refine their health care cost management endeavors. One of the most striking findings to emerge from these micro analyses is that a very small percentage of plan members, the "high cost patients," are responsible

for a substantially disproportionate share of total plan expenditures.

Three recent studies illustrated this phenomenon among the members of large corporate medical plans. In an in-depth examination of health care costs and their management at three Fortune 500 corporations, Whitted (1984) found evidence that in two of the firms 1% to 2% of the plan members were responsible for one-quarter to one-third of total medical claims expense. The Health Data Institute analyzed the expense and utilization experience of the 40 highest cost patients in a group medical plan of 9,200 members. These 40 individuals, comprising less than 0.5% of plan membership, were responsible for more than 16% of the group's entire medical claims expense from October 1982 to December 1983 (Rosenbloom & Gertman, 1984). In analyzing the 1984 claims experience for one of the nation's largest financial institutions, U.S. Corporate Health Management (1985) discovered that the 3% of plan members for whom the company paid at least $5,000 each in covered medical charges incurred more than 45% of total plan expenses.

Considering that the purpose of insurance is to share the risk of infrequent, financially burdensome events among a large population, it is not surprising or inherently a problem that the distribution of health plan expenditures is skewed. Ideally, premium dollars are redistributed according to need, and it is reasonable to assume that only a few insureds in a "healthy" working population will suffer from a catastrophic medical condition. What makes employers' recent discovery of a high cost patient population problematic is the growing number of studies suggesting that the utilization experience of this population is less than optimal. For example, the majority of admissions to intensive care units, whose costs are substantially higher than regular room and board charges and whose use is apt to be dominated by the high cost patients, are for noninvasive monitoring rather than immediate major interventions (Knaus, Wagner, Draper, Lawrence & Zimmerman, 1981; Thibault, Mulley, Barnett, Goldstein, Reder, Sherman & Skinner, 1980). In addition, the extremely skewed distribution of health plan expenditures raises serious questions about the relative efficacy of cost control measures applied to the total covered population.

Focusing health care expense management resources on the high cost patient population offers potential for significant savings. What constitute appropriate mechanisms for controlling the utilization and expenses of this group of patients, however, have yet to be determined. For noncatastrophically ill patients, cost sharing features of medical plans (i.e., deductibles and coinsurance) have been shown to reduce the demand for medical services without adversely affecting health status (Newhouse, Manning, Morris, Orr, Duan, Keeler, Leibowitz, Marquis, Marquis, Phelps & Brook, 1981; Brook, Ware, Rogers, Keeler, Davies, Donald, Goldberg, Lohr, Masthay & Newhouse, 1983). High cost illness, however, does not appear to be a function of specific health plan features (Birnbaum, 1978; Phelps & Newhouse, 1973), and most group medical plans place limitations on cost sharing so that seriously ill patients are not overburdened by excessive out-of-pocket medical expenses.

The unavailability of cost sharing to moderate the use of medical services by high cost patients is one factor that has encouraged employers to explore nontraditional approaches to meeting this challenge. Other considerations have been: (a) the desire to facilitate positive health outcomes by helping assure that severely ill patients receive appropriate services in a coordinated and cost effective manner; (b) a vested interest in rehabilitating patients to the fullest extent possible, particularly employees who might be able to return to work; and (c) recognition that high cost patients are apt to suffer from a variety of physical and emotional problems that require special approaches to alleviate. Individual case management of high cost patients, the approach of choice to date, involves a level of intervention into the patient-provider relationship that extends far beyond any cost control method previously attempted by employers.

Case Management

Case management lacks a single uniform definition since it implies a varying set of activities depending on the population being served. Merrill (1985, p. 5) contends that the main objective of case management is "the organization and sequence of services and resources to respond to an individual's health care problem." He describes case management as a series of four interrelated steps: (1) assessment and planning; (2) coordination and referral; (3) patient

treatment of a medical problem; and (4) monitoring. According to Merrill, assisting individuals to meet their *social* needs (i.e., housing, meals, adult day care, etc.) can be an important component of *medical* case management, particularly for an elderly population.

In discussing its application to employer-sponsored health plans, Hembree (1985, p. 11) defines *case management* as "the combination of activities designed to ensure appropriate use of medical care facilities; improve quality of care; control or reduce costs; ensure proper referrals; provide primary care; and manage patient's episodes of care, disability and rehabilitation." These definitions are basically compatible and both can be thought of when "case management" is referred to throughout this research.

The introduction of case management in indemnity health insurance plans is a recent occurrence, but the general concept is not new. For many years, health maintenance organizations have applied primary care case management (PCCM) by requiring patients to select a primary care physician through whom all their care must be initiated. This physician "gatekeeper" acts as a case manager by coordinating all treatment plans and specialist referrals. Several states are also using PCCM in their attempts to control spiraling Medicaid costs (Spitz, 1985).

Unlike PCCM, which pertains to all health care services for a given population, the type of case management employers are beginning to add to their fee-for-service health plans focuses on patients who have suffered from a catastrophic medical problem such as a heart attack, cancer, stroke, severe trauma, serious burn, organ failure, prematurity, neurological condition or psychiatric problem. The role of the case manager, or case management team, is to work with the patient, the patient's family and the physician (or other providers) to assure that appropriate care is rendered in a coordinated manner, according to an established and agreed-upon treatment plan. The case manager does *not* provide medical care to the patient; he or she usually works on behalf of the payer. In cases where it would be more cost effective for the health plan to pay for services not usually covered, and where the interests of quality and patient preferences would be served, the case manager may work with the carrier and the employer to see that an exception is made in reimbursement.

Individual case management of high cost cases offers a method for controlling health care utilization and expenses that appears to be mutually beneficial to the patient and the payer. Providers of case management services promote themselves as patient advocates who monitor the patient's condition and treatment; identify potential referral sources in the community; explain the medical and financial implications of various treatment options (when options exist) to patients and their families; and assist in the decision making process (Henderson & Wallack, 1987). The promised result is higher quality, lower cost care than otherwise would have been provided.

Apart from a few anecdotal reports of great savings for individual patients attributable to case management (Delaney & Aquilina, 1987; Hembree, 1985; Mazoway, 1987; Spencer and Associates, 1983), there is very little evidence at this time to substantiate vendors' claims. In part, this is probably because most employer and carrier-sponsored case management programs are too new to have collected the requisite evaluation data. Nonetheless, in spite of the lack of information, employers' movement toward catastrophic case management is gaining momentum. In 1983, only 1.3% of the respondents to the Health Research Institute's Cost Containment Survey of the 1,500 largest private employers in the nation reported using case management services. At least 44 of these employers, representing 7.1% of the survey respondents, now use some or all case management activities (Hembree, 1985). In 1985, 10% of the corporate benefits officers among employers of at least 500 employees claimed to have implemented a medical case management system during the past three years. Fifteen percent of employees in similar size firms indicated that their health insurance plan has a medical case management system which "provides a medical professional to manage high cost catastrophic illness by working with the patient, family and physician to develop long term treatment plans" (Louis Harris and Associates, 1985, p. 25). The growing attention being devoted to high cost patients, combined with the proliferation of vendors aggressively marketing their case management services, promises continued employer investment in this area for at least the next few years.

Section III

Statement of the Problem

Case management services offer great promise for both reducing expenses and enhancing patient satisfaction with the quality of treatment (Whitted & Torrens, 1985). However, as mentioned previously, the effectiveness of these services has not been carefully evaluated. In addition, many important ethical and medical practice issues surrounding employer-sponsored case management services have not received adequate attention in the published literature. Confidentiality of patient information is an example of one such issue. Without adequate safeguards against the transmittal of personal health information to employers, employees are unlikely to trust case managers or involve them in health care decisions. This is particularly true of employees with sensitive medical problems (e.g., chemical dependency; AIDS; psychiatric disorders; etc.) who may fear discrimination with respect to promotions, layoffs and other job-related decisions due to their health status.

An inherent limitation of catastrophic case management as presently implemented is its reactive nature. Case managers typically become involved with patients *after* they are diagnosed with conditions that are associated with very large medical expenditures, e.g., cancer, severe trauma, AIDS, etc. By the time these diagnoses have been made, however, many patients have already incurred high cost expenditures. In addition, for some diagnoses there may be little the case manager can do to improve the medical or financial outcome once treatment has been initiated.

Two intuitively appealing alternatives to case management's "after the fact" response to high cost illness are: (1) prevention of diseases and conditions that tend to result in large medical expenditures; and (2) early intervention with individuals who have significant likelihood of becoming high cost patients. However, inadequate knowledge concerning high cost patients in employment-related medical plans has made it difficult to determine the relative efficacy of these three approaches, i.e., prevention, early intervention and case management. It has also constrained the design and implementation of new programs to deal with the problems of high cost patients.

Although employers often receive reports from their carriers concerning *very* large claims paid by their plans (e.g., those over $10,000 or $25,000), the information provided is generally limited to the amount of the claim and the associated diagnosis, or major diagnostic category. The focus of these reports is usually the *claim*, not the *patient*. Comprehensive data on individual high cost patients' expense and utilization experiences (e.g., total expenditures for the year; number of hospitalizations; number of outpatient visits; different diagnoses and surgical procedures; sociodemographic characteristics) are seldom furnished to employers on a routine basis. While some employers undoubtedly have examined the experience of the high cost patients in their plans in greater detail, reports from these analyses have failed to appear in the literature.

Considerable health services research has been devoted to issues concerning catastrophic illness and high cost patients. With rare exceptions, however, nearly all of these studies pertain to populations other than the one of greatest interest to employers, i.e., middle income workers and their families. Individual high cost patients in employer-

sponsored fee-for-service medical plans have not been investigated with respect to sociodemographic characteristics; the health problems from which they suffer; the types of services they use; and trends over time in their expense and utilization experiences. Without these types of data, employers are limited in their ability to confront the challenges posed by high cost patients.

Section IV

Research Objective

This research was designed to answer the following question:

> How is the high cost patient population in an employer-sponsored fee-for-service medical plan characterized with respect to: (a) sociodemographics; (b) leading health problems; and (c) medical plan expenditures and utilization rates, within a single year and over a period of years?

The study was stimulated by a desire to improve the level of information concerning high cost patients in employment-related fee-for-service medical plans. Its goal was to provide employers and other sponsors of group medical plans with data that can be used to help prevent high cost cases or, when prevention is not possible, to develop interventions that effectively address the medical, emotional and financial problems experienced by high cost patients. While a formal evaluation of case management was not possible with the available data, an important objective of the study was to consider the implications of the research findings with respect to case management services.

Section V

Prior Related Research

Several excellent studies of high cost illness have been conducted over the past two decades. However, minimal research attention has been accorded to high cost patients among members of job-related medical plans, the dominant form of private health insurance in the United States. Except for three studies of high cost patients among members of the Federal Employees Health Benefit Plan (FEHBP) (A. D. Little, Inc., 1975; Birnbaum, 1978; Congressional Budget Office, 1982), no investigations have been published on high cost illness among patients under age 65 in an employer-sponsored fee-for-service group medical plan.

The unavailability of information about high cost patients in group medical plans was a prime motivator for this study. Without data regarding the expense and utilization experience of high cost patients, employers and other sponsors of group medical plans cannot identify, assess the magnitude of or capitalize on any cost savings potential inherent in this population.

The three studies of high cost illness based on Federal Employees Health Benefit Plan data did not provide employers with enough information to address the health, utilization and/or expense problems of the high cost patients in their medical plans. The initial two investigations were concerned primarily with estimating the incidence of high cost illness among the middle income population (A. D. Little, Inc., 1975; Birnbaum, 1978). The most recent study was conducted by the Congressional Budget Office (CBO) (1982) on five consecutive years of claims data for a sample of membership in the high option Blue Cross/Blue Shield plan. These five years of data were used to calculate the incidence of catastrophic illness among the middle income working population and to measure the medical expenses of high cost families during the years prior and subsequent to their initial high cost year.

The Congressional Budget Office study was similar to this research in that it focused on a middle income working population under age 65 and it compared the average expense of the high cost patients with the average expense of other plan members longitudinally. However, in relation to the objectives of this investigation, CBO's study of high cost illness expenditure patterns had some significant shortcomings. First, all expenditures for mental health care were excluded from analysis. This probably resulted in an underestimation of high cost illness among the middle income population, since psychiatric expenses are usually covered by group health plans, although often not as extensively as medical services. In addition, the long lengths of inpatient stays and/or prolonged periods of psychoanalysis frequently associated with psychiatric conditions make them likely candidates for high cost illness.

The Congressional Budget Office study also differed from the present research in that it focused on families rather than individual plan members as the unit of analysis and restricted its investigation to the annual level of family medical expenditures over the five year period. No data were examined on the utilization of services by high cost patients or their major health problems.

Most of the recent studies that have contributed to what is known about high cost patients pertain to populations other than the one of greatest interest to employers, i.e., middle income working groups. In

addition, these studies were designed to address broad public policy concerns, such as: (a) assessing the adequacy of existing health care financing programs for protecting families from unanticipated major medical expenses (Birnbaum, 1978; Congressional Budget Office, 1977; Kasper, Anderson & Brown, 1975); (b) measuring the contribution over time of high cost illness to the rate of increase in national health care costs (Congressional Budget Office, 1982; Kasper *et al.*, 1975; Trapnell & McFadden, 1977); or (c) estimating the cost and impact on health system resources of the implementation of an additional categorical medical program, such as national catastrophic health insurance (A. D. Little, Inc., 1975; Birnbaum, 1978; Congressional Budget Office, 1977; Kobrinski & Matteson, 1981; Schroeder, Showstack & Roberts, 1979).

Findings from these studies are critical to public policy deliberations about alternative mechanisms for financing catastrophic illness in the United States. From the perspective of employers (and other sponsors of group health plans) attempting to reduce their health care cost burden by focusing on the individual high cost patients in their medical plans, however, most of the major findings from prior research are of limited use. Many of the studies focused on estimating the incidence of catastrophic illness (applying several different definitions of *catastrophic*) among the general population and in various subpopulations thereof, e.g., the poor; the elderly; the institutionalized; the nonpoor, nonelderly, etc. (Birnbaum, 1978; Congressional Budget Office, 1977; Congressional Budget Office, 1982; Helbing, 1983; Kasper *et al.*, 1975; Lubitz & Prihoda, 1984; McCall, 1984). Some sociodemographic information (primarily age and gender mix) is available from these economic analyses. However, they provide almost nothing on the proportion of high cost use that is attributable to specific diagnoses or the types, frequency and costs of services used by high cost patients.

Two large scale investigations of high cost use among hospitalized patients did identify the major categories of medical problems associated with this population in several different types of hospitals (Schroeder *et al.*, 1979; Zook & Moore, 1980). However, the pertinence of a group of hospitalized patients, many of whom were over age 65, to a group of employees under 65 and their families is questionable. In addition, by restricting the analysis to hospitalized patients and their inpatient utilization experience, these studies ignored the additional influence of ambulatory care on the problem of high cost utilization.

In summary, the research and public policy contributions made by previous analyses of catastrophic illness and high cost patients should not be discounted. However, we are somewhat restricted in what can be extrapolated from these earlier studies because they were designed to address issues that have no (or minimal) bearing on this investigation and were often conducted on populations quite different from a group of middle income workers under age 65 and their dependents.

Section VI

Research Questions

A comprehensive review of the literature pertaining to high cost patients (Alexandre, 1987) demonstrated that there are still many unanswered questions pertaining to this population in employer-sponsored fee-for-service medical plans. Those questions which this study sought to answer are:

- Do high cost patients have an older average age than low cost patients?
- Controlling for age, are there differences in the proportion of males vs. females among high cost patients and low cost patients?
- At older ages, are males more likely to be high cost patients than females?
- Does the proportion of employees vs. spouses vs. dependents differ between high cost patients and low cost patients?
- What are the major diagnostic categories experienced most frequently by high cost patients?
- How frequently is repeat hospitalization for the same major diagnostic category experienced by high cost patients with multiple admissions in a single year?
- How frequently is acute trauma (e.g., motor vehicle accidents, burns, assaults, etc.) experienced by high cost patients?
- Compared with low cost patients, on a per capita basis, do high cost patients experience more:
  —Hospitalizations?
  —Hospital patient days?
  —Outpatient visits?
  —Outpatient physician visits?
  —Prescription medications?
  —Psychiatric hospitalizations?
  —Psychiatric patient days?
  —Outpatient mental health visits?
- Is the average expenditure for high cost patients in the years immediately prior and subsequent to their base high cost year similar to the average expenditure for the population, i.e., are Year 2 expenses independent of Year 1 expenses?
- What changes occur in inpatient and outpatient utilization rates for high cost patients in the years prior and subsequent to their base high cost year?
- In the years prior and subsequent to their base high cost year, are high cost patients' inpatient and outpatient utilization rates significantly above the average for the entire population?

Section VII

The Company and Its Medical Plan

An analysis of four years (1981-1984) of medical claims combined with personnel records from a very large financial institution was undertaken to address the research questions. During the years under investigation, the vast majority of this company's 80,000 employees resided in California; the remainder lived in either a different state or another country.

The age and gender composition of employees of this company is similar to that of other large financial institutions (U.S. Department of Commerce, 1980). The majority of employees (about three-fourths each year) are female, and their average age is fairly young (36 years in 1986). Employees are distributed throughout every county in California, with large concentrations in the San Francisco Bay Area and Los Angeles County.

Upon hire and at the end of each calendar year, benefits-eligible employees select a health care plan. They may either join the company's self-insured fee-for-service medical plan or enroll in one of the health maintenance organizations (HMOs) offered by their employer. Irrespective of which option they choose, employees are required to contribute to the cost of their coverage. To avoid making this contribution, about 20% of the employees each year opt for no coverage. About half of the remaining employees join the company's self-insured medical plan, herein referred to as "The Plan."

Until the beginning of 1984, The Plan provided basic benefits for inpatient hospital care and surgery, with *supplemental* major medical benefits for all other services. Under first dollar coverage provisions, i.e., no deductible, inpatient hospital services and supplies were covered at 100% and surgery was covered at 80%. An important exception to the provision of 100% coverage for inpatient hospital services was psychiatric care. At the beginning of 1982, inpatient psychiatric care was restricted to $10,000 per year; prior to that time, however, there were no limitations on inpatient psychiatric services.

With the exception of psychiatric care, outpatient services were covered at 80% after the major medical deductible ($100 per individual; $250 per family) had been met. Outpatient psychiatric care was covered at 50%, up to a calendar year maximum of $1,000. Physical therapy services, Christian Science care and chiropractic services were covered at 80%, up to a combined annual maximum of $750. Pregnancy-related expenses were covered, but preventive services were not. Out-of-pocket expenses were limited to $1,000 annually, excluding the deductible and any amounts exceeding the benefit maximums described above. The lifetime maximum benefit paid by The Plan was $300,000 for major medical expenses.

In 1984, The Plan was transformed to provide *comprehensive* major medical benefits. This meant that the deductible, which was raised to $150 per individual ($375 per family), applied to all covered services. Once the deductible was met, The Plan paid 80% of usual, customary and reasonable charges for medically necessary services. Coverage was added for preventive services, including well baby care, routine childhood immunizations and Pap smears. The $1,000 annual limit on out-of-pocket expenditures was not changed, but the lifetime maximum benefit was increased to $500,000. Finally, to encourage more appropriate utilization

of surgery benefits, a mandatory second surgical opinion program and outpatient surgery incentives were added to The Plan.

With the exception of a three day inpatient detoxification benefit, chemical dependency—alcoholism and drug abuse—was *not* covered by The Plan during the years under investigation. The company has maintained a special benefit program for chemical dependency problems designed to refer patients to appropriate sources of treatment in the community. During the years studied, this program was not often used because its administration was very informal and most employees were unaware of its existence. When the program was used, provider claims were processed internally by the company rather than its carrier. Data concerning chemical dependency problems experienced by the study population were therefore unavailable for analysis.

Section VIII

Data Sources and Elements

The company supplied computerized personnel records for this research. For each employee, the personnel database provided his or her Social Security number; date of employment; date of birth; zip code of residence; medical plan; most recent *prior* medical plan (only if a change in plans had ever been made) and the date coverage in that plan ended; and a transaction code reflecting the status of the employee (e.g., new hire, rehire, leave of absence, voluntary termination, etc.), along with the date upon which the transaction took effect.

At the company's request, computerized tapes of claims records from its fee-for-service medical plan were provided by its claims administrator. The claims files originally contained 100% of *claims paid* between January 1, 1981 through December 31, 1985. These files were subsequently transformed into *claims incurred* (i.e., dates of service) from January 1, 1981 through December 31, 1984, so that they would be consistent with the personnel records.

The claims data reflected the medical care expenses and utilization of each employee, spouse and child covered by The Plan during the study period. Included in the record of each claim filed on behalf of these individuals was the employee's Social Security number; relationship of the claimant to the employee (i.e., employee, spouse or child); claimant's date of birth and gender; date of service; date of payment; provider of service; type of provider; place of service; number of units of service (e.g., hospital days, outpatient visits, prescription drugs, etc.); an ICD diagnostic code; a CPT-4 or RVS procedure code; the billed charge; the allowed charge; and the paid amount.

For each year investigated, claims records were linked with personnel records on the basis of employee Social Security number—a variable common to both data sets. In addition to providing sociodemographic and job-related information, the personnel records provided variables that were used to derive employee eligibility for the study. Spouses and children were assumed to have the same eligibility as their related employee because dependent-specific eligibility data for The Plan were unavailable.

Numerous cleaning and editing tasks were performed on both the personnel data and the claims data before they were merged. The steps that were followed in preparing the combined database are described in the Appendix. Also discussed in the Appendix are: (a) all decision rules and assumptions that were made in preparing the data for analysis, along with their rationale; (b) strengths and weaknesses of the data with respect to the research objectives; and (c) a more comprehensive description of the research methods.

Section IX

Research Methods

The Dependent Variable

The dependent variable for this study—annual medical expenditures—was operationalized as annual adjusted allowable charges for individual claimants. Allowable charges included all expenses that were covered by The Plan, whether they were paid by the employee, The Plan or another carrier. To adjust for inflation in the health care sector from 1981 through 1984, allowable charges from 1981, 1982 and 1983 were inflated to 1984 values using the medical care component of the Consumer Price Index. Besides eliminating the influence of medical care inflation on the annual incidence of high cost patients in The Plan, the use of constant dollars enabled different calendar years of data to be combined for some of the longitudinal analyses.

When a claimant's adjusted allowable medical charges for the year equaled or exceeded $5,000, he or she was considered a "high cost" patient. Individuals whose annual allowable charges were $25,000 or higher were categorized as "very high cost" patients. "Low cost" patients were those whose annual allowable charges were less than $5,000.

Five thousand dollars was selected as the high cost threshold for three reasons. First, this level resulted in a group of high cost patients sufficiently large for reliable analysis. Second, it permitted the research findings to be compared with earlier investigations of high cost patients that used similar definitions. Finally, $5,000 is The Plan's individual stop-loss point, i.e., its catastrophic limit. After $5,000 in allowable charges are incurred by a member in a single year, The Plan pays 100% of additional allowable charges incurred during that year, up to the lifetime maximum benefit of $500,000.

With prices of medical care being as high as they have been, an individual with an annual medical expense of $5,000 in 1984 constant dollars was not necessarily someone who had a serious health problem. In many instances, a single inpatient episode for a "routine" operation or a relatively non-serious health condition could have resulted in a hospital bill of more than $5,000. For example, a prior analysis of the company's claims data found that the mean allowable inpatient charge for a Cesarean section delivery in 1983 and 1984 exceeded $5,000 (U.S. Corporate Health Management, 1985). Therefore, a threshold of $25,000 was added to the analysis to distinguish the more seriously ill patients from those who may simply have experienced a single hospital admission for less critical reasons.

The Independent Variables

Twelve sociodemographic, expense and utilization variables from the claims data were selected for analysis in this study. These variables were age; gender; dependent relationship; admissions; patient days; psychiatric admissions; psychiatric patient days; outpatient visits; outpatient physician visits; outpatient mental health visits; prescription drugs; and major diagnostic categories. Each of these independent variables is defined in the Appendix.

The Study Population

To be included in the study group for a particular year, an employee had to be full or prime time (i.e.,

benefits-eligible), under age 65, residing in California, and a member of The Plan for the entire 12 months. Also comprising the study population were the dependents of these employees, i.e., their covered spouses and children, so long as they were under age 65.

During each of the four years, employees who turned 65 or who had less than a complete year of membership in The Plan were excluded from analysis along with their dependents. Individuals with partial data were omitted to avoid complicating the analyses. In particular, relating partial years of claims data to a definition of *high cost* based on *annual* charges would have required the annualization of these data. Annualization in turn would have required an assumption that the charges incurred during the months of the year for which data were available could be reasonably extrapolated to project charges for the entire 12 month period. This assumption lacks validity, since many causes of illness and their resulting utilization are known to be seasonal (Falk, Rorem & Ring, 1933; McCall & Wai, 1981) and therefore *not* evenly distributed throughout the year.

Analyses

This study was undertaken as a link between investigations that have identified the disproportionate use of health care services by a small percentage of group medical plan members and anticipated research that will attempt to develop models for predicting future utilization based on sociodemographic characteristics, health status indices and prior expenses and utilization. As such, the investigation was comprised of analyses that were descriptive in nature, rather than predictive. The objective was to identify associations between annual level of medical expenditures and sociodemographic, expense and utilization variables that could lead to further studies designed to identify causal relationships.

For each year of data, claimants were categorized as low cost, high cost or very high cost. In addition to these broad expense categories, claimants were also stratified by the following (narrower) expense levels:

less than $150; $150-$499.99; $500-$999.99;
$1,000-$2,999.99; $3,000-$4,999.99;
$5,000-$9,999.99; $10,000-$19,999.99;
$20,000-$24,999.99; $25,000-$49,999.99;
$50,000-$74,999.99; $75,000-$99,999.99; and
$100,000-plus.

Once this stratification was accomplished, the distribution of plan expenditures within each expense category and level was cross-classified with the distribution of claimants. This was done to determine the extent to which certain groups of claimants were responsible for a disproportionate share of plan expenses. The mean expense for claimants in each expense category was also identified and compared with the average for all claimants.

In response to the research questions, three additional types of descriptive analyses were undertaken on the claimant population. First, low cost, high cost and very high cost claimants were profiled in terms of their age distribution, gender composition and dependent relationship mix (i.e., employees vs. spouses vs. children). A finite set of basic relationships between annual medical spending and age, gender and dependent relationship were investigated to determine whether high cost patients could be distinguished from low cost patients in terms of these variables or combinations thereof. Tests of the statistical significance of these relationships were made using chi-square and ANOVA analyses. These analyses were conducted on all four years of data to ascertain the level of consistency in the identified associations.

The next set of analyses examined the temporal expense and utilization experience of high cost claimants in years both subsequent and prior to their high cost year. The availability of four consecutive years of claims data made it possible to track the expenses and utilization rates of cohorts of claimants for up to three years prior or subsequent to a high cost year. Claimants were assigned to a cohort according to their expense category in their base year, i.e., the first year of data in which they appeared as a claimant. To be included in a cohort, an individual had to have been a claimant in the base year and eligible to submit claims for reimbursement (i.e., be a member of The Plan) in each of the subsequent or prior years analyzed.

The final set of analyses examined the distribution of inpatient, outpatient and total expenditures for high and very high cost patients by major diagnostic category. Hospital admissions and patient days were also distributed by major diagnostic category, as were outpatient visits and outpatient physician vis-

its. These distributions indicated the relative contributions of each major diagnostic category to the expense and utilization experience of the high and very high cost patients. By studying the distributions in all four years, it was possible to determine if certain diagnostic categories were consistently responsible for a large proportion of expenses and/or utilization for the high cost and very high cost patients.

Section X

Research Findings

Distribution of Plan Expenses

During each of the four years studied, 6% of the claimants incurred expenses of $5,000 or more (Table I). (Tables I-XXIX and Figures 1-10 can be found immediately following this section.) These claimants were consistently responsible for more than half of total plan expenses (Table II). The very high cost claimants—those with annual expenses of at least $25,000—represented just 0.5% to 0. 6% of all claimants, but they accounted for 18% to 22% of total plan expenditures.

The ratios presented in Table III demonstrate considerable stability from year to year in the percent of claimants vs. the percent of expenses within each expense category. These ratios reflect the relationship between the mean expense for claimants in a specific expense category and the mean expense for all claimants. In 1984, for example, the mean expense for low cost patients ($651) was slightly less than half (.47) the average expense for all claimants ($1,383). The average expense for high cost claimants ($9,073) was 6.57 times the average for all claimants.

Year-to-year stability persisted even when claimants and expenses were distributed among more narrowly defined expense levels, e.g., less than $150, $150-$499.99, $500-$999.99, etc. (Table IV). In all four years, claimants whose expenses were less than $3,000 accounted for 90% of total claimants and one-third of total expenses. At the opposite end of the distribution, the 2% of claimants with the highest expenses were responsible for 35% to 37% of total expenses. Out of 28,335 claimants in 1984, the most expensive 12 (.04%) collectively incurred expenses of nearly $2.7 million—7% of total plan expenses.

In 1984, 30% of all claimants had expenses that did not exceed The Plan's annual (individual) deductible of $150 (Table IV). The average expense for these 8,550 claimants was just $72. (Although a similar percentage of claimants had expenses below $150 during 1981-1983, the individual deductible in those years was only $100.)

Age, Gender and Dependent Relationship

Age

The high cost patients were significantly older than the low cost patients in all four years ($p<.001$, one way analysis of variance). In 1981 through 1984, patients with annual expenses between $5,000 and $25,000 were 6.5 to 7.8 years older, on average, than patients with annual expenses of less than $5,000 (Table V). Patients with expenditures of $25,000 or more were 8.6 to 11.0 years older than patients with less than $5,000 in plan expenses, but they were only 0.8 to 3.9 years older than patients in the $5,000 to $25,000 range. In three out of four years, the difference between the mean age of the very high cost patients and that of the high cost group was *not* statistically significant.

Although Table V demonstrates a strong positive relationship between age and annual medical expenditures, Table VI indicates that the relationship was not entirely linear. In the lowest three expense levels—less than $150, $150 to $500 and $500 to $1,000—age steadily increased with rising medical expenses. From $1,000 to $3,000 and $3,000 to $5,000, however, the average age of claimants was similar to or slightly younger than that of claimants

with $500 to $1,000 in expenses. Average age generally rose as expenses grew from $5,000 to $25,000. Above $25,000, however, the relationship between age and level of expense was much less consistent, varying from year to year in direction and magnitude.

In three of the four years, the average age of the very highest cost claimants, i.e., those with expenses of at least $100,000, was younger than the average age of the very lowest cost claimants, i.e., those with expenses of less than $150 (Table VI). In 1984, for example, patients with expenses of at least $100,000 were four years younger, on average, than patients with expenses of less than $150; they were almost nine years younger than all claimants combined.

One way to evaluate the relationship between age and the frequency of low cost, high cost and very high cost medical expenses is to compare the age distribution of claimants in each expense category with the age distribution of all claimants. If medical expenditures were independent of age, claimants in each expense category would be expected to have the same age distribution as all claimants. As shown in Table VII, this was *not* the case. Infants, i.e., individuals under one year of age, represented 2.6% of claimants in 1984, but they accounted for 6.3% of the very high cost claimants. Claimants age one through 19 were extremely underrepresented among the high cost and very high cost claimants. Almost 24% of all claimants were one to 19 years of age, but only 7% and 9% of high cost and very high cost claimants, respectively, were in this age range. Relative to their representation among all claimants, individuals age 20 through 39 were slightly overrepresented among the high cost claimants, but they were underrepresented among the very high cost group. Among the high cost and very high cost groups, the degree of overrepresentation by claimants age 40 through 64 increased sharply with age. Individuals 60 to 64 years comprised just 4.5% of total claimants, but they accounted for 8% and 14%, respectively, of the high cost and very high cost claimants.

Distributions similar to that reported in Table VII were observed in the data for 1981, 1982 and 1983. In all four years, chi-square analysis demonstrated that the association between expense category and age group was highly statistically significant ($p<.001$).

Gender

Females comprised 61% to 62% of all claimants, but they accounted for 70% to 73% of claimants with expenses ranging from $5,000 to $25,000 (Table VIII). Of claimants with annual expenditures of $25,000 or higher, however, only 41% to 50% were female. Hence, males were overrepresented in the very high cost category. In 1984, for example, 54% of the very high cost claimants were male, compared to 39% of all claimants.

Table IX presents the percent of female claimants in each expense level. From $1 to $10,000, the percent of claimants that were female rose steadily with increasing expense level. From $10,000 to $20,000, females were still overrepresented relative to their percentage in the total group of claimants, but to a much lesser degree than in the $5,000 to $10,000 expense level. At $25,000, the trend was reversed, so that males tended to dominate throughout the upper expense levels.

If gender was independent of annual medical expenditures, the percentages of male and female claimants that were low cost, high cost and very high cost would be expected to the same as for all claimants. Table X demonstrates, however, that females consistently incurred more high cost and fewer very high cost expenditures than the total population. Conversely, males exhibited fewer high cost cases and more very high cost cases than average. Chi-square analysis demonstrated in all four years that gender was not independent of expense category ($p<.001$).

Age and Gender

Table XI provides the distribution of claimants by gender and age within each expense category for 1984. Relative to their proportion among all claimants, women ages 20 through 64 were overrepresented among the high cost claimants, with the greatest disparity occurring from ages 20 through 39, and 60 through 64. Women 20 through 39 years accounted for 40% of all high cost claimants in 1984, but only 26% of total claimants. Until age 50, males were slightly overrepresented among the low cost claimants and very underrepresented among the high cost claimants. However, males 40 through 64 years were dramatically overrepresented among the very high cost claimants. These men repre-

sented just 13.5% of all claimants, but they accounted for more than 35% of the very high cost claimants. (Data from 1981, 1982 and 1983 reflect the same patterns as 1984.)

Table XII reports the percent of claimants in each gender and age group that were low cost, high cost and very high cost in 1982 and 1984. Two years of data are presented in this table to show that while the percentages for all males, all females and all claimants were similar in both years, the percentages within the age groups for each gender exhibited considerable variation from year to year. For example, 6.6% of male infants were high cost or very high cost claimants in 1984, compared with 3.9% in 1982.

The information presented in Table XII can be used to calculate the relative probabilities of claimants in different age and gender groups being high cost or very high cost patients. For example, in 1984 female claimants 20 to 39 years were 2.5 times more likely to be high cost than male claimants in the same age range. In both 1982 and 1984, male claimants 50 to 64 years were twice as likely as their female counterparts to be very high cost patients. This latter finding suggests that within older age groups male claimants are more apt to be high cost than female claimants.

One research question this study sought to answer was whether, controlling for age, any differences would be observed in the proportion of males and females among high cost claimants. Age-adjusted rates of high cost and very high cost expenditures among male and female claimants were calculated to address this issue. On average, female claimants were 1.5 times more likely than male claimants to have annual expenses ranging from $5,000 to $25,000. Male claimants, however, were 1.8 times more likely than female claimants to be very high cost patients.

Dependent Relationship

Relative to their percentages among all claimants, employees and spouses were very slightly underrepresented among low cost patients each year (Table XIII). Among claimants with expenses of $5,000 to $25,000, employees and spouses were both overrepresented—the former to a greater degree. In two of the four years (1981 and 1984), employees were slightly overrepresented among the very high cost patients; in the other two years they were slightly underrepresented. Spouses, however, were overrepresented among the very high cost claimants in all four years, and to a greater magnitude than were employees. Children were substantially underrepresented among the high cost claimants. Children were also underrepresented among the very high cost claimants, but to a lesser degree than among the high cost claimants. In 1984, for example, children represented 30% of all claimants, but only 11% of high cost claimants and 16% of very high cost claimants.

If level of medical spending was not associated with dependent relationship, claimants in each expense category and level would be comprised of the same percentage of employees, spouses and children as all claimants in the study group. This independence was not borne out by the data ($p<.001$, chi-square analysis). Relative to their proportions among all claimants, employees and spouses were underrepresented in the two lowest expense levels (Table XIV). In 1984, employees were increasingly overrepresented in each successive expense level between $500 and $10,000; they continued to be overrepresented up to $75,000, although generally to a lesser extent than in the lower expense levels. Beyond $25,000, employees' representation in each expense level varied from year to year.

Table XIV shows that in 1984 spouses were overrepresented in expense levels from $500 to $20,000; beyond $20,000 their representation was mixed. However, in two of the three years not displayed in Table XIV (1981 and 1982), spouses were overrepresented in expense levels up to $75,000; in 1983, spouses were overrepresented in every expense level between $500 and $100,000.

In 1984, children were underrepresented in every expense level between $500 and $100,000, but they were substantially overrepresented in the two lowest expense levels and the $100,000+ level (Table XIV). In 1981, 1982 and 1983, children were also overrepresented in the $75,000 to $100,000 level.

Dependent Relationship and Gender

As shown in Table XV, male employees and male spouses in 1984 accounted for almost twice as many very high cost claimants as expected based on their proportion among all claimants. Male employees

were underrepresented among the high cost claimants, while male spouses were somewhat overrepresented in that group. Female employees and female spouses were overrepresented among claimants with expenses of $5,000 to $25,000, but they were underrepresented among claimants with expenses of $25,000 or higher. Children of both genders were underrepresented among the high cost and very high cost claimants, although males were less underrepresented than females in both expense categories. (Similar patterns were observed in the three years of data not displayed in Table XV.)

Findings from Table XVI suggest that gender may be more closely associated with medical expenditure category than dependent relationship. In 1982 and 1984, female employees and female spouses were equally likely to have expenses between $5,000 and $25,000. Female employees, however, were about twice as likely as male employees to be high cost claimants. Female employees were slightly more apt than female spouses to be very high cost claimants, while male spouses were two to three times more likely than female spouses to be very high cost claimants. In 1982 and 1984, respectively, male employees were 1.4 and 2.0 times more likely to be very high cost claimants than female employees. Among children claimants in 1984, males were 2.6 times more apt than females to be very high cost; in 1982, however, male children were only 30% more likely than female children to be very high cost claimants.

Subsequent Expenses and Utilization

As described more fully in the Appendix, individuals who were claimants in 1981 and members of The Plan during all four years of the study (n=16,794) were assigned to one of three cohorts based on the 1981 total expenses: low cost (below $5,000); high cost ($5,000-$24,999.99); or very high cost ($25,000 or more). These cohorts were then followed from 1981 through 1984 to identify year-to-year changes in their mean annual expenditures and utilization rates.

Per Capita Total Expenses

Per capita total expenses declined substantially from 1981 to 1982 for both the high cost and very high cost claimants, while they increased 57% for the low cost claimants (Table XVII). As shown in Figure 1, the drop in mean annual expense was particularly steep for the very high cost cohort. These very high cost claimants experienced a reduction in mean total expense of more than three-quarters, from $48,838 in 1981 to $10,734 in 1982.

In 1981, the per capita expenditure of the high cost claimant cohort (n=869) was $9,160—6.8 times the mean expense ($1,343) of all 1981 claimants who were members of The Plan from 1981 through 1984. By 1982 per capita expenditures of the high cost claimant cohort had decreased by two-thirds, to $3,102.

Despite a substantial regression toward the mean by each of the claimant cohorts, which is well illustrated in Figure 1, the average expense of the high cost claimant cohort in 1984 ($2,480) was more than double that of all claimants ($1,047), and the per capita expense of the very high cost claimants ($5,418) was more than five times the average of all claimants.

Use of Inpatient Services

The temporal patterns exhibited in mean *inpatient* expense of the three claimant cohorts (Table XVIII and Figure 2) were quite similar to those observed in mean *total* expense. For example, the average inpatient expenditure of the high cost claimant cohort declined 75% from 1981 and 1982, and then remained stable through 1983. From 1983 to 1984, the mean inpatient expense of this cohort decreased 31%.

The very high cost claimants experienced a dramatic drop in per capita inpatient expenses, from $43,734 in 1981 to $6,259 in 1982. This 86% reduction was followed by additional declines of 49% from 1982 to 1983, and 39% from 1983 to 1984. In spite of an overall 96% decrease during the four year period, the average inpatient expenditure for very high cost claimants in 1984 ($1,950) was still nearly four times the average inpatient expense for all claimants ($503).

In 1981, the very high cost cohort utilized 5,763 patient days per 100 claimants—65 times the rate used by all claimants, and 7.5 times the level used by claimants with expenses of $5,000 to $25,000 (Table XVIII). Within one year, however, patient days per 100 declined 83% for the very high cost claimants, and by the third subsequent year (1984), patient days per 100 in this group were 243.3—96%

lower than the 1981 figure, but still 5.5 times the 1984 average for all claimants.

The declines in patient days experienced by the very high cost claimant cohort in 1982 and 1983 were the result of both lower admission rates (Table XVIII) and much shorter lengths of stay. In 1984, there was a 12% rise in admissions per 100 claimants, so the entire decline in patient days per 100 was attributable to the decrease in average length of stay, from 10.6 days in 1983 to 6.2 days in 1984.

Among the high cost claimant cohort, there was a 74% reduction in patient days per 100 from 1981 to 1982. This resulted from a 76% drop in admissions per 100 combined with a 10% increase in the average length of stay for these admissions. Patient days per 100 continued to decline from 1982 through 1984, although at a much slower rate than from 1981 to 1982. Most of the reduction was attributable to fewer admissions rather than shorter lengths of stay.

Use of Outpatient Services

Per capita *outpatient* expenses declined much less rapidly for the high cost and very high cost claimant cohorts from 1981 to 1984 than per capita *inpatient* expenses (Table XIX and Figure 3). In 1981, the very high cost claimants averaged $5,104 in outpatient expenditures—nine times the mean outpatient expense for all claimants ($562). From 1981 to 1982, outpatient expenses per capita in the very high cost group declined by just 12%; in 1984, the mean outpatient expense for these claimants was $3,469—one-third lower than the 1981 level, but still 6.4 times the average for all claimants.

From 1981 to 1982, the high cost cohort—i.e., claimants with total expenses of $5,000 to $25,000—experienced a 32% reduction in mean outpatient expense, from $1,826 to $1,246. This figure rose 6% from 1982 to 1983, and then declined 11% in the fourth year. The net result was a 35% drop in mean outpatient expense from 1981 to 1984 for the high cost cohort. During the same period, the per capita outpatient expense for the low cost cohort was relatively stable, increasing by just 6% over the four years. Hence, regression toward the mean was much less pronounced for per capita *outpatient* expenditures than for per capita *inpatient* expenses.

With respect to the use of outpatient services, the low cost claimants experienced no overall change from 1981 through 1984 in annual visits or physician visits per capita (Table XIX). On average, each of the low cost claimants experienced 5.6 outpatient practitioner visits per year, 4.1 (73%) of which were with a physician. However, the mean annual use of outpatient prescription medications among the low cost claimants increased steadily over the four years, from 3.3 medications (including refills) per claimant in 1981 to 4.2 in 1984 (Table XIX).

High cost claimants averaged 12.8 outpatient visits in 1981, ten (78%) of which were with a physician. This was just over double the per capita number of visits (and *physician* visits) experienced by all claimants. From 1981 to 1982, mean outpatient visits among the high cost cohort declined by one-fifth, and then remained relatively constant through 1984. In 1984, this cohort visited with a physician in an outpatient setting 1.8 times more often, on average, than all claimants (7.7 vs. 4.3 visits). Unlike the low cost claimants, who experienced a substantial rise in per capita use of outpatient prescription drugs from 1981 through 1984, no major change in prescription drug utilization was observed among the high cost claimant cohort during this period.

The declines experienced by the very high cost cohort in per capita visits (and physician visits) were larger and more persistent from year to year than those experienced by the high cost cohort. From 1981 through 1984, the very high cost claimants experienced 38% reductions in both mean annual visits and physician visits. These claimants averaged 24.2 outpatient visits in 1981, 18 (74%) of which were with a physician. This was four times the mean number of visits (and physician visits) used by all claimants. On average, the very high cost claimants had 18.6 more visits than the low cost claimants and 11.4 more visits than the high cost claimants in 1981. By 1984, these large variations in the use of outpatient practitioners had been reduced by at least one-half.

Temporal use of prescription medications among the very high cost cohort exhibited a different pattern than that of the high cost cohort. Between 1981 and 1982, outpatient utilization of prescription drugs among the very high cost cohort rose by almost 50%, from 12.3 to 18.2 medications per capita. In 1983 and 1984, however, mean use of outpatient prescription drugs among the very high cost claimants decreased 13% and 6%, respectively.

Prior Expenses and Utilization

A methodology similar to that used for the subsequent year analyses was employed to investigate prior year expenses and utilization of the high cost claimants. Individuals who were claimants in 1984 and members of The Plan during all four years of the study (n=18,914) were assigned to one of three cohorts (i.e., low cost, high cost or very high cost) based on their total expenses in 1984. Annual per capita expenses and utilization rates were then calculated for each of the three cohorts during 1981 through 1984.

Findings from the prior year analyses are presented below. Upon review of these findings, it was thought useful to longitudinally investigate one additional subset of the study group—individuals who were claimants in either 1982 or 1983, the "base" year, and who were members of The Plan in at least one year prior *and* one year subsequent to the base year. These 26,936 claimants were assigned to one of the three cohorts (i.e., low cost, high cost or very high cost) according to their total expenses in the base year. (For those individuals who were members of The Plan in all four years and claimants in both 1982 and 1983, 1982 was considered to be the base year.) Findings from the prior-base-subsequent analyses are incorporated below.

Per Capita Total Expenses

Three years before being categorized as very high cost, this group of claimants had a mean total expense ($5,143) that was 5.6 times the average for all claimants ($919) (Table XX). From 1981 to 1982, the very high cost cohort experienced a 73% rise in mean expense; this amount increased another 35% from 1982 to 1983 (Figure 4). Between 1983 and 1984, the per capita expenditure for the very high cost claimants escalated 357%, to $55,154—40 times the 1984 mean expense for all claimants.

Similar to the very high cost cohort, per capita expenditures for the high cost claimants increased steadily from 1981 through 1983, and then rose sharply (200%) from 1983 to 1984. These increases, however, occurred at a much slower rate than the increases experienced by the very high cost claimants. In 1981, the mean expense for the high cost cohort was $2,382—2.6 times the mean expense for all claimants. By 1984, the per capita expense of this cohort had grown to $9,212—6.7 times the average.

A comparison of the data presented in Tables XVII and XX, combined with the observation that Figures 1 and 4 appear to be almost mirror images of each other, suggested that per capita expenditures for high and very high cost patients in the first year after being categorized as low, high or very high cost replicated per capita expenses in the year immediately preceding this categorization. To verify whether this was in fact the case for a single group of claimants, a prior-base-subsequent analysis was undertaken on 26,936 members of the study group who had at least three consecutive years in The Plan and one or more claim in the middle (base) year.

Figure 5 indicates that in the first subsequent year, the mean expense of the very high cost claimants declined to an amount slightly (23%) above that in the first prior year. The difference in mean expense between the first subsequent year and the first prior year was even smaller for the high cost claimant cohort (14%).

Use of Inpatient Services

As shown in Table XXI and Figure 6, the mean inpatient expense for the high and very high cost claimant cohorts increased 287% and 700%, respectively, from 1983 to 1984, while it declined 79% for the low cost cohort. Sixteen percent and 57% increases in mean inpatient expense were experienced from 1981 to 1982 for the high cost and very high cost cohorts, respectively; from 1982 to 1983, however, per capita inpatient expenses remained fairly stable for the high cost claimants and increased just 11% for the very high cost group.

In 1981, three years before being identified as high cost or very high cost, these claimant cohorts respectively incurred a mean inpatient expense of $1,593 (three times the average for all claimants) and $3,295 (6.3 times the average). In 1982 and 1983, the mean inpatient expense for the very high cost claimants was about nine times the group average; in 1984, it was more than 63 times the average.

A prior-base-subsequent analysis revealed that mean inpatient expenses for the high and very high cost claimants in the first year subsequent to the base year closely approximated mean inpatient expenses during the first prior year (Figure 7). In fact, for the very high cost cohort, the mean inpatient expense in the first subsequent year was 6% *lower* than in the first prior year; among the high cost

cohort, the mean expense in the first subsequent year was 6% *higher* than in the first prior year.

From 1981 through 1984, patient days per 100 claimants rose 830% in the very high cost cohort (Table XXI). The vast majority of this increase took place between 1983 and 1984, when patient days per 100 grew almost 500%, from 559 to 3,332. This huge increase was accounted for by a 264% rise in admissions per 100 claimants (Table XXI) combined with a 63% growth in average length of stay, from 7.6 days in 1983 to 12.4 days in 1984. In 1981, the very high cost cohort utilized more than six times as many patient days per capita as all claimants; by 1984, this cohort had a patient days rate that was 54 times the average.

All of the 220% increase in patient days per 100 experienced by the high cost cohort from 1981 to 1984 occurred between 1983 and 1984. From 1981 to 1982, the 19% increase in admissions per 100 for this cohort was entirely offset by the 15% reduction in the average length of stay. From 1982 to 1983, per capita admissions for the high cost claimants increased 5% but the average length of stay dropped 15%, resulting in a 10% decrease in patient days per 100. Since the average length of stay for admissions by this cohort continued to decline from 1983 to 1984, all of the 3.5-fold increase in patient days per capita that occurred between these two years was due to an increase in admissions per claimant of nearly 300%. During each of the three prior years, the high cost cohort utilized about three to three and a half times as many patient days per capita as all claimants; in 1984, this cohort used, on average, more than ten times as many patient days as the total group of claimants.

In the prior-base-subsequent analysis of admissions per 100 claimants (Figure 8), the admission rate of the high cost cohort in the first subsequent year (27.3 per 100) was found to be almost identical to what it was in the first prior year (27.8 per 100). For the very high cost cohort, however, the admission rate in the first subsequent year was 40% greater than it was in the first prior year.

Use of Outpatient Services

Per capita outpatient expenses grew 67% from 1981 to 1984 for all individuals who were claimants in 1984 and plan members throughout the four years (Table XXII). Outpatient visits and physician visits per capita also increased by two-thirds, and outpatient prescription medications per claimant rose 75%. These increases in outpatient expenses and utilization occurred in relatively even annual increments from 1981 through 1984.

The high cost claimant cohort incurred per capita outpatient expenses of $2,171 in 1984, 2.8 times the level in 1981 ($789) and 3.3 times the 1984 average for all claimants ($658) (Table XXII and Figure 9). The greatest portion of this increase occurred between 1983 and 1984. Very high cost claimants experienced a 400% rise in per capita outpatient expenses, from $1,848 in 1981 (almost five times the average for all claimants) to $9,196 in 1984 (14 times the average). Unlike per capita *inpatient* expenses, which grew most rapidly from 1983 to 1984, the largest percentage increase in per capita *outpatient* expenses for the very high cost cohort occurred between 1981 and 1982.

A prior-base-subsequent year analysis of mean *outpatient* expense (Figure 10) revealed substantial differences from the same type of analysis of mean *inpatient* expense (Figure 7), particularly among the very high cost claimants. In the year immediately following that in which claimants were categorized as low, high or very high cost (i.e., the base year), the mean outpatient expense of the very high cost claimants was not only much higher than it was in the year immediately preceding the base, it was even larger than in the base year. Since the per capita *inpatient* expense for the very high cost cohort in the first subsequent year was less than in the first prior year (Figure 7), all of the rise in mean *total* expense in the first subsequent year over the first prior year (Figure 5) was attributable to the continued escalation of per capita *outpatient* expenditures. Among the high cost cohort, although the mean outpatient expense in the first subsequent year was much lower than in the base year, it was still 30% greater than in the year prior to the base.

Outpatient visits and outpatient physician visits per capita both increased 221% from 1981 to 1984 in the very high cost cohort (Table XXII); prescription drug use grew almost 200% over the same period of time. On average, very high cost claimants incurred 31.8 outpatient visits in 1984, 27.6 (87%) of which were with a physician. This was 4.5 times the average number of outpatient visits used by all claimants, and 5.2 times the average number of physician visits. The largest increase in per capita

outpatient visits for the very high cost claimants occurred between 1983 and 1984. In this time period, mean outpatient visits increased 75%, and those with a physician rose 80%.

Similar to the very high cost cohort, the high cost claimants experienced steady growth in per capita outpatient visits and physician visits from 1981 to 1984. Annual increases during this time, however, were generally smaller than those experienced by the very high cost group. These increases resulted in an overall rise in outpatient visits per capita among the high cost claimants of 125%, from 6.7 in 1981 to 15.1 in 1984. Between 75% and 78% of outpatient visits for high cost patients each year were with a physician, compared with 84% to 87% of those for the very high cost patients. On average, high cost claimants in 1981 saw a practitioner in an outpatient setting 1.6 times more often than all claimants; by 1984, the high cost claimants experienced more than twice as many outpatient practitioner visits as all claimants.

Steady annual increases in per capita prescription drug use were experienced by all three cohorts from 1981 to 1984, with the sharpest growth occurring among the very high cost claimants (Table XXII). These individuals nearly tripled their mean use of outpatient prescription drugs, from 7.0 in 1981 (2.5 times the average for all claimants) to 20.2 in 1984 (4.1 times the average). On a per claimant basis, the high cost cohort averaged 12.1 prescription medications in 1984—two and a half times the mean for all claimants. This represented a 124% increase in per capita utilization of prescription drugs from 1981.

Leading Health Problems

Inpatient and outpatient expenses and utilization were distributed by 16 major diagnostic categories to identify the leading health problems of the high cost claimants (i.e., those with total expenses of $5,000 to $24,999.99) and the very high cost claimants (i.e., those with expenses of $25,000 or more). The major diagnostic categories (MDCs) used for the research were taken from the 9th edition of the International Classification of Diseases.

Distribution of Total Expenses by MDC

Six out of 16 MDCs were responsible for two-thirds of all expenses for patients with $5,000 to $25,000 in annual expenses (Table XXIII). In 1981, 1982 and 1983, these six MDCs included: complications of pregnancy, childbirth and the puerperium; diseases of the genitourinary system; symptoms, signs and ill-defined conditions; neoplasms; diseases of the digestive system; and diseases of the circulatory system. In 1984, diseases of the musculoskeletal system and connective tissue replaced diseases of the circulatory system as one of the six leading contributors to the total expenses of the high cost patients.

The largest percentage of total expenses for high cost patients in 1982 through 1984 was for pregnancy. Pregnancy-related expenses accounted for 16.3% of total expenses for the high cost patients in 1984, followed by neoplasms (10.8%) and symptoms, signs and ill-defined conditions (10.5%).

The distribution of expenses by MDC for the very high cost claimants was quite dissimilar to that for the high cost claimants. For instance, total expenses for the very high cost claimants were more concentrated in the top four MDCs than were total expenses for the high cost group. Each year, the leading four MDCs accounted for 60% to 66% of total expenses for the very high cost claimants compared with 47% to 50% of total expenses for the high cost claimants. In addition, the leading four MDCs for the two groups were different.

Based on contribution to total spending, diseases of the circulatory system comprised the number one health problem of the very high cost claimants. These diseases accounted for 22% to 30% of total expenses for the very high cost claimants in all four years. Neoplasms and symptoms, signs and ill-defined conditions also ranked high on the list of the six leading contributors to total expenses of the very high cost claimants. Other MDCs often found among the top six were diseases of the digestive system; injury and poisoning; and certain conditions originating in the perinatal period.

Pregnancy and diseases of the genitourinary system, two of the leading contributors to total expenses for the high cost claimants, were not among the most frequent health problems of the very high cost patients. In fact, in three of the four years, pregnancy accounted for the smallest portion of total expenses for the very high cost claimants; in the fourth year, pregnancy was the second smallest contributor. Pregnancy accounted for less than one-

half of 1% of total expenses for the very high cost claimants in all four years.

Just as there were MDCs that were common among the high cost patients but rare among the very high cost patients, perinatal conditions and injury and poisoning were two MDCs that were common among the leading contributors to expenses of the very high cost claimants but not among those for the high cost patients. Year-to-year variation in the percentage of total expenses for the very high cost claimants that was accounted for by these two conditions was high, ranging from 5.8% to 11.5% for injury and poisoning, and 0% to 16.5% for perinatal conditions. Acute trauma (represented by the injury and poisoning MDC) made a relatively minor contribution to the total expense and utilization experience of the high (or very high) cost claimants.

Distribution of Inpatient Expenses and Services by MDC

From 1981 to 1984, the percentage of high cost patients with no admissions during the year rose from 5.34 to 7.42 (Table XXIV). Almost three-quarters of the high cost claimants each year experienced just a single admission. Repeat hospitalization for the same MDC was experienced by about half of all high cost claimants with multiple admissions in a single year. From 1982 through 1984, of those claimants with two or more admissions in the year (19% to 23% of all high cost claimants), just under one-half (45% to 47%) were hospitalized with the same MDC for all of their admissions; in 1981, 51% of the high cost patients with at least two inpatient stays had the same MDC for all admissions that year.

Surprisingly, a larger proportion of the *very high cost* patients experienced no admissions in their very high cost year than was the case for the high cost patients (Table XXIV). This proportion was quite consistent across all four years, ranging from 8.24% to 8.62% of all the very high cost claimants. A review of the claims for several of the individuals with annual expenses of at least $25,000 but no hospitalization during the year revealed that many of these patients were receiving regular dialysis treatments on an outpatient basis for end-stage renal disease.

A substantially smaller proportion of the very high cost claimants were admitted to the hospital just once compared with the high cost claimants (23% to 28% each year vs. 72% to 74%). With the exception of 1981, the majority of very high cost claimants with multiple hospitalizations in a single year did not have the same MDC for all admissions.

Pregnancy was the leading cause of hospitalization for high cost patients in three of the four years, and the second leading cause of admission in the fourth year (Table XXV). In 1983 and 1984, pregnancy accounted for approximately one out of every five admissions for the high cost claimants. Each year, genitourinary problems and pregnancy together accounted for nearly one-third of total admissions and inpatient expenditures for the high cost patients. Digestive disorders and neoplasms were the next most frequent causes of hospital admission for this group. These two MDCs together were responsible for about one-fifth of admissions and inpatient expenses for the high cost claimants annually.

Diseases of the circulatory system and the musculoskeletal system were also frequently found in the top six inpatient MDCs for high cost patients. Together, these two MDCs were associated with 17% of all admissions and 19% of total inpatient expenses for the high cost claimants in 1984.

Although not a leading cause of hospitalization, mental disorders were among the top contributors to patient days for the high cost patients in three of the four years. Mental disorders were responsible for 11% to 16% of total patient days for the high cost patients in 1982 through 1984.

Among the very high cost claimants, diseases of the circulatory system and neoplasms ranked one and two as the leading causes of hospitalization from 1981 through 1983; in 1984, neoplasms were first and circulatory diseases were second (Table XXVI). Together, these two MDCs were responsible for 40% to 52% of admissions, and 38% to 52% of inpatient expenditures annually for the very high cost claimants. Diseases of the circulatory system alone comprised 19% to 28% of their admissions and one-fourth to one-third of their total inpatient expenditures.

Apart from neoplasms and circulatory conditions, the list of MDCs accounting for the greatest proportion of inpatient expenses and utilization varied much more from year to year for the very high cost claimants than it did for the high cost

claimants. In addition, the MDCs which accounted for a large percentage of admissions for the very high cost claimants did not always account for a large percentage of patient days, and vice versa. For example, mental disorders were responsible for 14.7% of admissions for these claimants in 1981, but they accounted for 36.5% of patient days. In the same year, diseases of the circulatory system represented 25.7% of all admissions, but only 11.1% of patient days.

Perinatal conditions were not responsible for many admissions among the very high cost patients, but when perinatal admissions occurred, they tended to have a long length of stay and be very expensive. For example, perinatal conditions accounted for fewer than 2% of all admissions for the very high cost claimants in 1984, but these problems represented 9% of patient days and 19% of total inpatient expenditures.

Injury and poisoning was also among the top six contributors to inpatient expenses and patient days for the very high cost claimants in all four years of the study. Similar to admissions for perinatal problems, admissions for injury and poisoning tended to be associated with longer lengths of stay and higher average charges.

Table XXVII compares the average (allowable) charge per admission in each MDC between the high cost and very high cost claimants. The average charge per hospitalization incurred by the high cost claimants ranged from $5,902 (1981) to $6,138 (1984). Although an individual claimant could have had total annual expenses up to $25,000 and still been categorized as high cost (rather than very high cost), the average charge per admission in all 16 MDCs across all four years for the high cost patients never exceeded $10,000.

Among the high cost claimants, perinatal conditions had the highest average charge in three out of the four years, and the second highest average charge in the fourth year. Mental disorders and musculoskeletal problems were also among the six most expensive MDCs associated with hospitalization in all four years. In at least two out of the four years, neoplasms, diseases of the circulatory system, diseases of the digestive system and congenital anomalies were also on the list of the six most costly inpatient MDCs for the high cost patients.

With an average charge per admission ranging from $29,708 (1982) to $187,214 (1984), conditions originating in the perinatal period were associated with the most expensive hospitalizations for the very high cost claimants in three of the four years. Other MDCs that were associated with the most expensive hospitalizations for the very high cost claimants in at least two of the four years were infectious and parasitic diseases, injury and poisoning, mental disorders, diseases of the nervous system and sense organs, circulatory diseases, digestive disorders, and congenital anomalies.

Distribution of Outpatient Expenses and Services by MDC

From 1981 through 1984, symptoms, signs and ill-defined conditions accounted for 21% to 28% of all outpatient visits and physician visits, and 37% to 41% of outpatient expenses for the high cost patients (Table XXVIII). Unspecified conditions accounted for a much larger proportion of total outpatient expenses than of outpatient visits because a substantial percentage of outpatient prescription drug claims (about 20% of all claims) and claims for outpatient diagnostic tests were submitted without a diagnosis.

Apart from the unspecified conditions, outpatient visits and expenses for the high cost claimants were much less concentrated among a few MDCs than were admissions, patient days and inpatient expenses. It was relatively uncommon for a single MDC to account for more than 10% of outpatient visits, physician visits or expenses.

Mental disorders and injury and poisoning were the second and third leading causes of outpatient visits in all four years for the high cost claimants. Together, these two MDCs accounted for 20% to 26% of all outpatient visits incurred annually by the high cost claimants. In three of the four years, diseases of the musculoskeletal system and connective tissue, diseases of the respiratory system and diseases of the genitourinary system were also responsible for relatively large percentages of outpatient visits.

The MDCs most frequently associated with outpatient physician visits for the high cost patients varied from year to year. However, mental disorders and diseases of the respiratory system were often among the second and third leading MDCs associated with physician visits, followed by diseases of the genitourinary system.

Symptoms, signs and ill-defined conditions ac-

counted for even larger percentages of outpatient visits and expenses for the very high cost claimants than they did for the high cost group. These unspecified illnesses were responsible for 29% to 44% of all outpatient visits for the very high cost claimants, 32% to 46% of their outpatient physician visits and about 55% of their total outpatient expenditures each year (Table XXIX).

Neoplasms and circulatory diseases were the next most frequent contributors to outpatient visits and expenditures for the very high cost claimants in most years. Together, these two MDCs accounted for approximately one-fifth of all outpatient visits, 17% to 27% of outpatient physician visits, and 15% to 23% of outpatient expenditures for the very high cost claimants from 1981 through 1984. Other MDCs that accounted for a relatively large percentage of outpatient utilization and expenses for these claimants were endocrine, nutritional and metabolic diseases and immunity disorders; mental disorders; genitourinary diseases; and injury and poisoning.

Table I

NUMBER, PERCENT AND MEAN EXPENSE OF CLAIMANTS IN EACH EXPENSE CATEGORY 1981-1984

Expense Category	1981			1982			1983			1984		
	N	Percent of Total	Mean Expense	N	Percent of Total	Mean Expense	N	Percent of Total	Mean Expense	N	Percent of Total	Mean Expense
Low cost (<$5,000)	26,581	94.16	$ 629	30,860	94.16	$ 644	31,317	93.98	$ 664	26,669	94.12	$ 651
High cost ($5,000-24,999.99)	1,480	5.24	$ 8,995	1,739	5.31	$ 9,284	1,805	5.42	$ 9,076	1,523	5.38	$ 9,073
Very high cost ($25,000+)	170	0.60	$49,298	174	0.53	$45,281	202	0.61	$51,543	143	0.50	$56,100
Total*	28,231	100.00	$ 1,361	32,773	100.00	$ 1,339	33,324	100.01	$ 1,428	28,335	100.00	$ 1,383

*Percents may not total to 100.00 due to rounding error.

Table II

PERCENT OF CLAIMANTS IN EACH EXPENSE CATEGORY AND THE PERCENT OF EXPENSES INCURRED BY THESE CLAIMANTS 1981-1984

Expense Category	1981		1982		1983		1984	
	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses
Low cost	94.16	43.52	94.16	45.26	93.98	43.69	94.12	44.27
High cost	5.24	34.66	5.31	36.79	5.42	34.43	5.38	35.26
Very high cost	0.60	21.82	0.53	17.95	0.61	21.88	0.50	20.47
Total*	100.00	100.00	100.00	100.00	100.01	100.00	100.00	100.00

*Percents may not total to 100.00 due to rounding error.

Table III

RATIO OF THE PERCENT OF EXPENSES TO THE PERCENT OF CLAIMANTS IN EACH EXPENSE CATEGORY 1981-1984

Expense Category	1981	1982	1983	1984
Low cost	0.46	0.48	0.46	0.47
High cost	6.61	6.93	6.35	6.57
Very high cost	36.37	33.87	35.87	40.94

Table IV

PERCENT OF CLAIMANTS IN EACH EXPENSE LEVEL AND THE PERCENT OF EXPENSES INCURRED BY THESE CLAIMANTS 1981-1984

	1981		1982		1983		1984	
Expense Level	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses	Percent of Claimants	Percent of Expenses
<$150	31.16	1.69	30.53	1.69	29.65	1.54	30.17	1.58
$150-499.99	32.84	7.00	32.39	7.00	32.02	6.53	31.51	6.68
$500-999.99	13.68	7.07	14.03	7.34	14.34	7.05	14.53	7.37
$1,000-2,999.99	12.42	16.29	13.07	17.30	13.59	16.80	13.86	17.49
$3,000-4,999.99	4.05	11.47	4.14	11.92	4.37	11.77	4.05	11.16
$5,000-9,999.99	3.82	19.34	3.74	19.55	3.96	19.33	3.89	19.68
$10,000-19,999.99	1.24	12.37	1.35	13.74	1.23	11.64	1.33	13.18
$20,000-24,999.99	0.18	2.96	0.21	3.50	0.22	3.46	0.15	2.40
$25,000-49,999.99	0.42	10.85	0.38	9.86	0.42	10.54	0.36	9.02
$50,000-74,999.99	0.11	4.92	0.10	4.66	0.10	4.36	0.08	3.31
$75,000-99,999.99	0.03	2.04	0.02	1.59	0.05	2.87	0.02	1.29
$100,000+	0.04	4.00	0.02	1.84	0.03	4.12	0.04	6.85
Total*	99.99	100.00	99.98	99.99	99.98	100.01	99.99	100.01

*Percents may not total to 100.00 due to rounding error.

Table V

MEAN AGE OF CLAIMANTS IN EACH EXPENSE CATEGORY 1981-1984

Expense Category	1981	1982	1983	1984
Low cost	32.16	31.38	31.26	31.36
High cost	39.95	38.44	39.06	37.82
Very high cost	40.74	42.33	41.20	40.37
All claimants	32.62	31.81	31.75	31.75

The hypothesis that the claimants in each expense category would have the same mean age was rejected in all four years at $p<.001$ using one way analysis of variance.

Table VI

MEAN AGE OF CLAIMANTS IN EACH EXPENSE LEVEL 1981-1984

Expense Level	1981	1982	1983	1984
<$150	27.28	26.41	26.16	26.94
$150-499.99	32.21	31.41	31.05	30.63
$500-999.99	38.09	36.92	36.88	35.83
$1,000-2,999.99	36.41	35.87	35.85	36.72
$3,000-4,999.99	36.23	34.90	34.70	35.52
$5,000-9,999.99	38.89	37.24	38.13	36.95
$10,000-19,999.99	42.57	41.11	41.08	40.22
$20,000-24,999.99	44.33	42.55	44.47	39.21
$25,000-49,999.99	43.25	43.89	42.52	40.27
$50,000-74,999.99	39.68	43.32	44.56	48.05
$75,000-99,999.99	29.22	27.25	31.88	48.83
$100,000+	25.91	24.17	27.36	22.92
All claimants	32.62	31.81	31.75	31.75

Table VII

AGE DISTRIBUTION OF CLAIMANTS IN EACH EXPENSE CATEGORY 1984

Age Group	Percent of Low Cost Claimants	Percent of High Cost Claimants	Percent of Very High Cost Claimants	Percent of Total Claimants
< 1 year	2.62	1.90	6.29[2]	2.60
1- 9 years	12.64	1.58	3.50	12.00
10-19 years	12.29	5.58	5.59	11.89
20-29 years	17.09	21.86[1]	11.19	17.32
30-39 years	19.93	25.21[1]	12.59	20.18
40-49 years	16.70	17.66	20.28[1]	16.77
50-59 years	14.51	18.38[1]	26.57[2]	14.78
60-64 years	4.22	7.81[2]	13.99[2]	4.46
Total*	100.00	99.98	100.00	100.00

*Percents may not total to 100.00 due to rounding error.
1. 10-49% greater than expected based on representation among all claimants.
2. At least 50% greater than expected based on representation among all claimants.
The hypothesis that expense category would be independent of age group was rejected at $p<.001$ using chi-square analysis.

Table VIII

PERCENT OF CLAIMANTS IN EACH EXPENSE CATEGORY THAT ARE FEMALE 1981-1984

Expense Category	1981	1982	1983	1984
Low cost	61.64	60.96	60.75	60.34
High cost	70.47[1]	72.17[1]	72.85[1]	72.29[1]
Very high cost	48.24	50.00	41.09	46.15
All claimants	62.02	61.50	61.28	60.91

1. 10-49% greater than expected based on representation among all claimants.
The hypothesis that expense category would be independent of gender was rejected at $p<.001$ in all four years using chi-square analysis.

Table IX

PERCENT OF CLAIMANTS IN EACH EXPENSE LEVEL THAT ARE FEMALE 1981-1984

Expense Level	1981	1982	1983	1984
<$150	57.43	57.05	56.61	56.27
$150-499.99	60.69	60.57	59.39	60.16
$500-999.99	64.47	61.88	62.96	60.66
$1,000-2,999.99	68.15	67.47	67.02	66.81
$3,000-4,999.99	72.20[1]	69.20[1]	72.00[1]	68.88[1]
$5,000-9,999.99	73.75[1]	75.55[1]	75.70[1]	75.25[1]
$10,000-19,999.99	62.96	63.21	67.80[1]	64.81
$20,000-24,999.99	52.94	69.57[1]	50.00	61.90
$25,000-49,999.99	48.74	53.17	43.26	46.60
$50,000-74,999.99	48.39	38.24	35.29	50.00
$75,000-99,999.99	66.67	25.00	37.50	33.33
$100,000+	27.27	83.33[1]	36.36	41.67
All claimants	62.02	61.50	61.28	60.91

1. 10-49% greater than expected based on representation among all claimants.

Table X

PERCENT OF CLAIMANTS IN EACH GENDER GROUP THAT ARE LOW COST, HIGH COST AND VERY HIGH COST 1981-1984

	Low Cost Claimants	High Cost Claimants	Very High Cost Claimants
1981			
Female	93.57	5.96[1]	0.47
Male	95.10	4.08	0.82[1]
All claimants	94.16	5.24	0.60
1982			
Female	93.34	6.23[1]	0.43
Male	95.47	3.84	0.69[1]
All claimants	94.16	5.31	0.53
1983			
Female	93.15	6.44[1]	0.41
Male	95.28	3.80	0.92[2]
All claimants	93.98	5.42	0.61
1984			
Female	93.24	6.38[1]	0.38
Male	95.49	3.81	0.70[1]
All claimants	94.12	5.38	0.50

1. 10-49% greater than expected based on the percentage of all claimants in this expense category.
2. At least 50% greater than expected based on the percentage of all claimants in this expense category.

The hypothesis that gender would be independent of expense category was rejected in all four years at $p<.001$ using chi-square analysis.

Table XI

GENDER AND AGE DISTRIBUTION OF CLAIMANTS IN EACH EXPENSE CATEGORY 1984

Gender and Age	Percent of Low Cost Claimants	Percent of High Cost Claimants	Percent of Very High Cost Claimants	Percent of Total Claimants
Females				
< 1 year	1.24	0.66	1.40[1]	1.21
1- 9 years	5.95	0.33	1.40	5.63
10-19 years	6.06	2.43	1.40	5.84
20-29 years	12.02	18.71[2]	8.39	12.36
30-39 years	12.98	21.21[2]	8.39	13.40
40-49 years	10.72	13.66[1]	9.09	10.87
50-59 years	8.90	10.97[1]	9.79	9.01
60-64 years	2.48	4.33[2]	6.29[2]	2.59
All female claimants	60.35	72.30[1]	46.15	60.91
Males				
< 1 year	1.38	1.25	4.90[2]	1.39
1- 9 years	6.69	1.25	2.10	6.37
10-19 years	6.23	3.15	4.20	6.05
20-29 years	5.07	3.15	2.80	4.95
30-39 years	6.95	4.01	4.20	6.78
40-49 years	5.98	4.01	11.19[2]	5.90
50-59 years	5.62	7.42[1]	16.78[2]	5.77
60-64 years	1.74	3.48[2]	7.69[2]	1.87
All male claimants	39.66	27.72	53.86[1]	39.08
Total*	100.01	100.02	100.01	99.99

*Percents may not total to 100.00 due to rounding error.

1. 10-49% greater than expected based on representation among all claimants.
2. At least 50% greater than expected based on representation among all claimants.

Table XII

PERCENT OF CLAIMANTS IN EACH GENDER AND AGE GROUP THAT ARE LOW COST, HIGH COST AND VERY HIGH COST 1982 and 1984

Gender and Age Group	1982 Low Cost Claimants	1982 High Cost Claimants	1982 Very High Cost Claimants	1984 Low Cost Claimants	1984 High Cost Claimants	1984 Very High Cost Claimants
Females						
< 1 year	94.50	3.44	2.06[2]	96.50	2.92	0.58[1]
1- 9 years	98.86	1.01	0.13	99.56	0.31	0.13
10-19 years	97.74	2.16	0.10	97.64	2.23	0.12
20-29 years	92.95	6.81[1]	0.24	91.52	8.14[2]	0.34
30-39 years	92.32	7.39[1]	0.29	91.17	8.51[2]	0.32
40-49 years	92.27	7.29[1]	0.44	92.82	6.75[1]	0.42
50-59 years	91.45	7.62[1]	0.94[2]	92.91	6.54[1]	0.55[1]
60-64 years	89.95	8.85[2]	1.20[2]	89.80	8.98[2]	1.22[2]
All female claimants	93.34	6.23[1]	0.43	93.24	6.38[1]	0.38
Males						
< 1 year	96.14	2.89	0.96[2]	93.40	4.82	1.78[2]
1- 9 years	98.51	1.21	0.28	98.78	1.05	0.17
10-19 years	97.77	1.90	0.33	96.85	2.80	0.35
20-29 years	96.85	2.88	0.27	96.29	3.42	0.29
30-39 years	96.31	3.45	0.24	96.51	3.18	0.31
40-49 years	93.88	5.37	0.75[1]	95.39	3.65	0.96[2]
50-59 years	91.80	6.77[1]	1.43[2]	91.62	6.91[1]	1.47[2]
60-64 years	88.39	8.77[2]	2.84[2]	87.90	10.02[2]	2.08[2]
All male claimants	95.47	3.84	0.69[1]	95.49	3.81	0.70[1]
All claimants	94.16	5.31	0.53	94.12	5.38	0.50

1. 10-49% greater than expected based on the percentage of all claimants in this expense category.
2. At least 50% greater than expected based on the percentage of all claimants in this expense category.

Table XIII

PERCENT OF CLAIMANTS IN EACH EXPENSE CATEGORY THAT ARE EMPLOYEES, SPOUSES AND CHILDREN 1981-1984

	Low Cost	High Cost	Very High Cost	All Claimants
1981				
Employees	52.23	65.68[1]	49.41	52.92
Spouses	20.12	24.32[1]	28.24[1]	20.39
Children	27.65	10.00	22.35	26.69
Total	100.00	100.00	100.00	100.00
1982				
Employees	51.41	64.86[1]	54.60	52.14
Spouses	20.02	25.13[1]	29.89[1]	20.35
Children	28.57	10.01	15.52	27.52
Total*	100.00	100.00	100.01	100.01
1983				
Employees	50.51	66.48[1]	47.03	51.35
Spouses	19.92	24.65[1]	34.16[2]	20.26
Children	29.58	8.86	18.81	28.39
Total*	100.01	99.99	100.00	100.00
1984				
Employees	49.06	63.62[1]	56.64[1]	49.89
Spouses	20.25	25.15[1]	27.27[1]	20.55
Children	30.69	11.23	16.08	29.57
Total*	100.00	100.00	99.99	100.01

*Percents may not total to 100.00 due to rounding error.

1. 10-49% greater than expected based on representation among all claimants.
2. At least 50% greater than expected based on representation among all claimants.

The hypothesis that expense category would be independent of dependent relationship was rejected in all four years at $p<.001$ using chi-square analysis.

Table XIV

PERCENT OF CLAIMANTS IN EACH EXPENSE LEVEL THAT ARE EMPLOYEES, SPOUSES AND CHILDREN 1984

Expense Level	Employees	Spouses	Children
<$150	39.37	18.97	41.66[1]
$150-499.99	47.70	19.35	32.94[1]
$500-999.99	56.34[1]	21.86	21.81
$1,000-2,999.99	61.54[1]	22.11	16.35
$3,000-4,999.99	63.12[1]	24.59[1]	12.29
$5,000-9,999.99	65.91[1]	23.93[1]	10.15
$10,000-19,999.99	57.67[1]	29.63[1]	12.70
$20,000-24,999.99	57.14[1]	16.67	26.19
$25,000-49,999.99	57.28[1]	28.16[1]	14.56
$50,000-74,999.99	81.82[2]	13.64	4.55
$75,000-99,999.99	33.33	66.67[2]	—
$100,000+	16.67	25.00[1]	58.33[2]
All claimants	49.89	20.55	29.57

1. 10-49% greater than expected based on representation among all claimants.
2. At least 50% greater than expected based on representation among all claimants.

Table XV

DEPENDENT RELATIONSHIP AND GENDER DISTRIBUTION OF CLAIMANTS IN EACH EXPENSE CATEGORY 1984

Dependent Relationship and Gender	Percent of Low Cost Claimants	Percent of High Cost Claimants	Percent of Very High Cost Claimants	Percent of Total Claimants
Employees				
Female	37.08	54.89[1]	34.97	38.03
Male	11.98	8.73	21.68[2]	11.85
All employees	49.06	63.62[1]	56.65[1]	49.88
Spouses				
Female	8.44	12.80[1]	6.99	8.66
Male	11.81	12.34	20.28[2]	11.88
All spouses	20.25	25.14	27.27[1]	20.54
Children				
Female	14.82	4.60	4.20	14.22
Male	15.86	6.63	11.89	15.35
All children	30.68	11.23	16.09	29.57
Total*	99.99	99.99	100.01	99.99

*Percents may not total to 100.00 due to rounding error.
1. 10-49% greater than expected based on representation among all claimants.
2. At least 50% greater than expected based on representation among all claimants.

Table XVI

PERCENT OF CLAIMANTS IN EACH GENDER AND DEPENDENT RELATIONSHIP CATEGORY THAT ARE LOW COST, HIGH COST AND VERY HIGH COST 1982 and 1984

	1982			1984		
	Low Cost Claimants	High Cost Claimants	Very High Cost Claimants	Low Cost Claimants	High Cost Claimants	Very High Cost Claimants
Female						
Employees	92.19	7.30[1]	0.51	91.78	7.76[1]	0.46
Spouses	92.04	7.62[1]	0.34	91.65	7.94[1]	0.41
Children	97.71	2.03	0.26	98.11	1.74	0.15
All female claimants	93.34	6.23[1]	0.43	93.24	6.38[1]	0.38
Male						
Employees	94.89	4.41	0.70[1]	95.12	3.96	0.92[2]
Spouses	93.15	5.73	1.12[2]	93.56	5.58	0.86[2]
Children	97.83	1.84	0.34	97.29	2.32	0.39
All male claimants	95.47	3.84	0.69	95.49	3.81	0.70[1]
Female and Male						
Employees	92.84	6.60[1]	0.56	92.57	6.86[1]	0.57[1]
Spouses	92.67	6.55[1]	0.78[1]	92.75	6.58[1]	0.67[1]
Children	97.77	1.93	0.30	97.68	2.04	0.27
All claimants	94.16	5.31	0.53	94.12	5.38	0.50

1. 10-49% greater than expected based on the percentage of all claimants in this expense category.
2. At least 50% greater than expected based on the percentage of all claimants in this expense category.

Table XVII

MEAN EXPENSE IN 1981-1984, BY 1981 EXPENSE CATEGORY

1981 Expense Category	N	1981 Mean Expense	1982 Mean Expense	1983 Mean Expense	1984 Mean Expense
Low cost	15,828	$ 622	$ 975	$1,024	$ 942
High cost	869	$ 9,160	$ 3,102	$3,199	$2,480
Very high cost	97	$48,838	$10,734	$7,373	$5,418
All claimants	16,794	$ 1,343	$ 1,141	$1,173	$1,047

The hypothesis that each claimant cohort would have a mean expense in 1982-1984 that was equal to its mean expense in 1981 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment.

Figure 1

MEAN EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1981

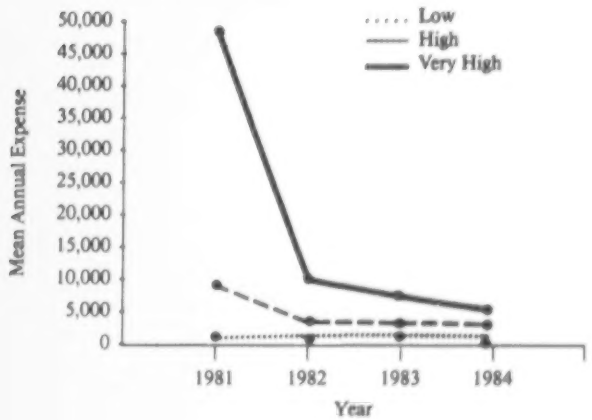

Table XVIII

INPATIENT EXPENSES AND UTILIZATION IN 1981-1984, BY 1981 EXPENSE CATEGORY

	1981 Expense Category			
	Low Cost (N=15,828)	High Cost (N=869)	Very High Cost (N=97)	All Claimants (N=16,794)
Mean Inpatient Expense				
1981	$158	$7,335	$43,734	$781
1982	$512	$1,857	$ 6,259	$615
1983	$529	$1,876	$ 3,175	$614
1984	$450	$1,296	$ 1,950	$503
Admissions per 100 Claimants				
1981	6.67	121.17	257.73	14.04
1982	10.17	28.77	65.98	11.45
1983	9.48	23.48	35.05	10.35
1984	7.80	18.99	39.18	8.56
Patient Days per 100 Claimants				
1981	17.92	753.39	5,762.89	89.16
1982	48.12	195.17	1,003.09	61.24
1983	45.69	159.38	370.10	53.44
1984	38.68	120.37	243.30	44.09
Average Length of Stay				
1981	2.7	6.2	22.4	6.4
1982	4.7	6.8	15.2	5.3
1983	4.8	6.8	10.6	5.2
1984	5.0	6.3	6.2	5.2

The hypothesis that each claimant cohort would have a mean inpatient expense in 1982-1984 that was equal to its mean inpatient expense in 1981 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment. The same type of test also led to a rejection at $p<.001$ of the hypotheses that: (1) each claimant cohort would have an admission rate in 1982-1984 that was equal to its admission rate in 1981, and (2) each claimant cohort would have a patient day rate in 1982-1984 that was equal to its patient day rate in 1981.

Figure 2

MEAN INPATIENT EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1981

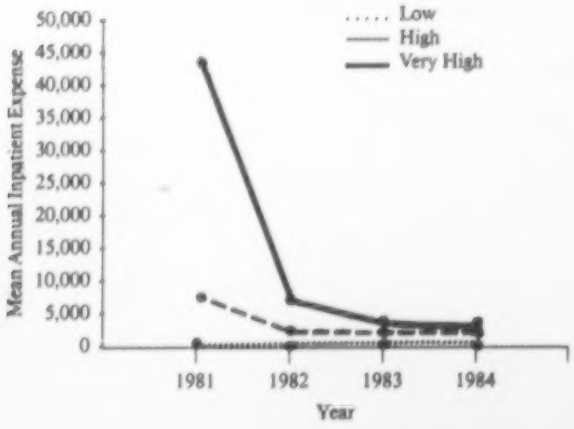

Table XIX

OUTPATIENT EXPENSES AND UTILIZATION IN 1981-1984, BY 1981 EXPENSE CATEGORY

	1981 Expense Category			
	Low Cost (N=15,828)	High Cost (N=869)	Very High Cost (N=97)	All Claimants (N=16,794)
Mean Outpatient Expense				
1981	$464	$1,826	$5,104	$562
1982	$462	$1,246	$4,475	$526
1983	$494	$1,324	$4,198	$559
1984	$492	$1,184	$3,469	$545
Mean Outpatient Visits				
1981	5.6	12.8	24.2	6.1
1982	5.5	10.1	20.2	5.8
1983	5.7	10.1	15.9	6.0
1984	5.6	9.6	14.9	5.8
Mean Outpatient Physician Visits				
1981	4.1	10.0	18.0	4.5
1982	4.1	7.8	14.2	4.3
1983	4.2	8.0	11.8	4.5
1984	4.1	7.7	11.2	4.3
Mean Outpatient Prescription Drugs				
1981	3.3	9.4	12.3	3.6
1982	3.9	9.5	18.2	4.3
1983	4.1	9.4	15.8	4.5
1984	4.2	9.6	14.9	4.5

The hypothesis that each claimant cohort would have a mean outpatient expense in 1982-1984 that was equal to its mean outpatient expense in 1981 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment. The same type of test resulted in the rejection at $p<.001$ of the hypotheses that: (1) each claimant would have a mean number of outpatient visits in 1982-1984 that was equal to its mean number of outpatient visits in 1981; (2) each claimant cohort would have an outpatient physician visit rate in 1982-1984 that was equal to its outpatient physician visit rate in 1981; and (3) each claimant cohort would have a mean number of outpatient prescription drugs in 1982-1984 equal to its mean number of outpatient prescription drugs in 1981.

Figure 3

MEAN OUTPATIENT EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1981

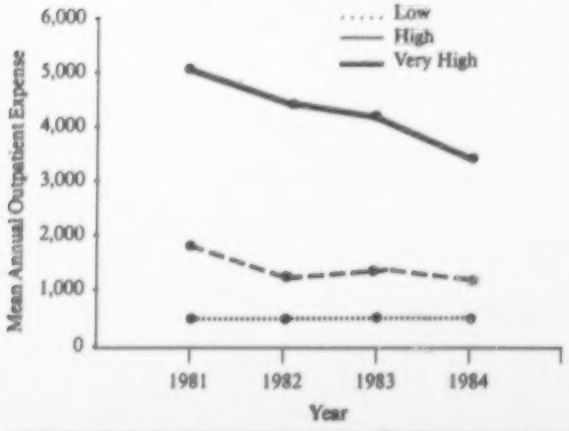

Table XX

MEAN EXPENSE IN 1981-1984, BY EXPENSE CATEGORY IN 1984

1984 Expense Category	N	1984 Mean Expense	1983 Mean Expense	1982 Mean Expense	1981 Mean Expense
Low cost	17,830	$ 642	$ 1,043	$ 893	$ 814
High cost	981	$ 9,212	$ 3,122	$2,768	$2,382
Very high cost	103	$55,154	$12,059	$8,913	$5,143
All claimants	18,914	$ 1,384	$ 1,210	$1,034	$ 919

The hypothesis that each claimant cohort would have a mean expense in 1981-1983 that was equal to its mean expense in 1984 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment.

Figure 4

MEAN EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1984

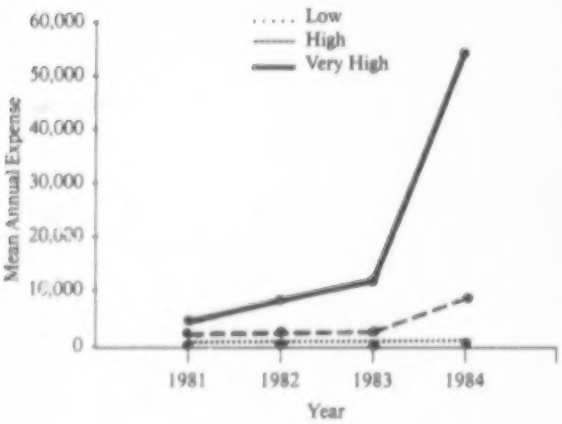

Figure 5

MEAN EXPENSE IN BASE YEAR PLUS FIRST PRIOR AND FIRST SUBSEQUENT YEARS BY EXPENSE CATEGORY IN BASE YEAR

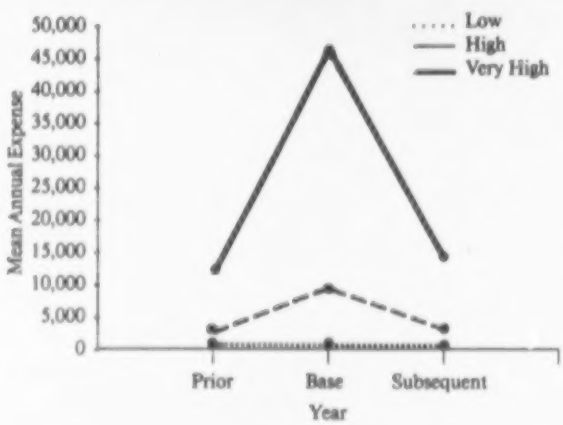

Table XXI

INPATIENT EXPENSES AND UTILIZATION IN 1981-1984, BY 1984 EXPENSE CATEGORY

	1984 Expense Category			
	Low Cost (N=17,830)	High Cost (N=981)	Very High Cost (N=103)	All Claimants (N=18,914)
Mean Inpatient Expense				
1984	$116	$7,041	$45,958	$725
1983	$553	$1,819	$ 5,745	$647
1982	$467	$1,845	$ 5,183	$565
1981	$449	$1,593	$ 3,295	$524
Admissions per 100 Claimants				
1984	4.72	115.39	268.93	11.90
1983	9.64	29.05	73.79	11.00
1982	9.22	27.62	46.60	10.38
1981	8.53	23.24	30.10	9.41
Patient Days per 100 Claimants				
1984	11.30	639.55	3,332.04	61.97
1983	46.43	180.94	559.22	56.20
1982	45.21	200.51	502.91	55.75
1981	49.08	200.00	358.25	52.59
Average Length of Stay				
1984	2.4	5.5	12.4	5.2
1983	4.8	6.2	7.6	5.1
1982	4.9	7.3	10.8	5.4
1981	5.8	8.6	11.9	6.2

The hypothesis that each claimant cohort would have a mean inpatient expense in 1981-1983 that was equal to its mean inpatient expense in 1984 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment. The same type of test resulted in rejection at $p<.001$ of the hypotheses that: (1) each claimant cohort would have an admission rate in 1981-1983 that was equal to its admission rate in 1984, and (2) each claimant cohort would have a patient day rate in 1981-1983 that was equal to its patient day rate in 1984.

Figure 6

MEAN INPATIENT EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1984

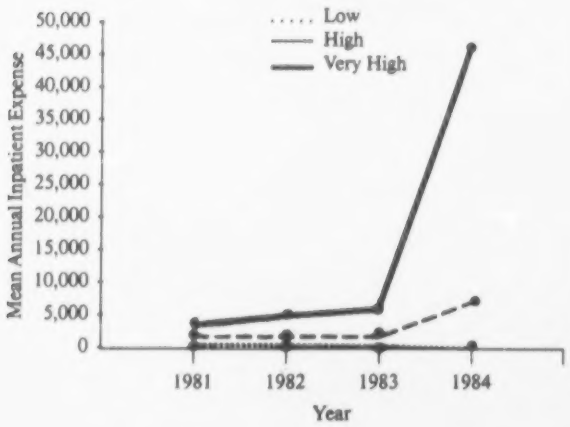

Figure 7

MEAN INPATIENT EXPENSE IN BASE YEAR PLUS FIRST PRIOR AND SUBSEQUENT YEARS BY EXPENSE CATEGORY IN BASE YEAR

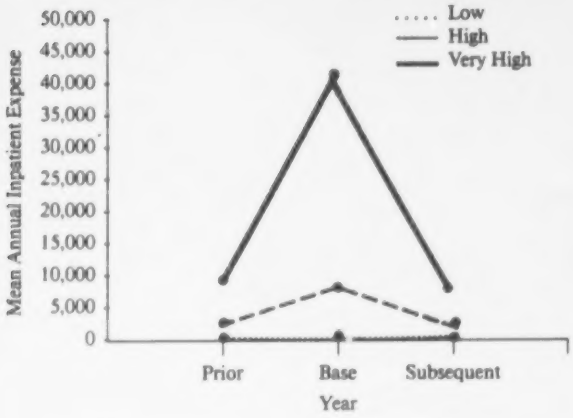

Figure 8

ADMISSIONS/100 CLAIMANTS IN BASE YEAR PLUS FIRST PRIOR AND SUBSEQUENT YEARS BY EXPENSE CATEGORY IN BASE YEAR

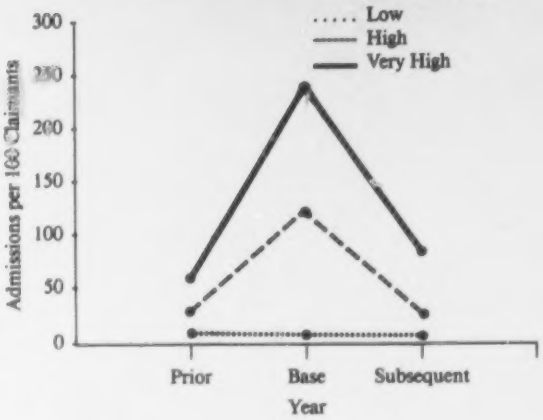

Table XXII

OUTPATIENT EXPENSES AND UTILIZATION IN 1981-1984, BY 1984 EXPENSE CATEGORY

	1984 Expense Category			
	Low Cost (N=17,830)	High Cost (N=981)	Very High Cost (N=103)	All Claimants (N=18,914)
Mean Outpatient Expense				
1984	$526	$2,171	$9,196	$658
1983	$489	$1,303	$6,313	$563
1982	$425	$ 923	$3,730	$469
1981	$365	$ 789	$1,848	$395
Mean Outpatient Visits				
1984	6.6	15.1	31.8	7.1
1983	5.8	10.9	18.2	6.1
1982	5.0	8.2	13.8	5.2
1981	4.2	6.7	9.9	4.3
Mean Outpatient Physician Visits				
1984	4.8	11.6	27.6	5.3
1983	4.3	8.2	15.3	4.6
1982	3.7	6.2	11.6	3.9
1981	3.1	5.2	8.6	3.2
Mean Outpatient Prescription Drugs				
1984	4.4	12.1	20.2	4.9
1983	4.0	9.1	13.7	4.3
1982	3.6	7.5	10.4	3.8
1981	2.7	5.4	7.0	2.8

The hypothesis that each claimant cohort would have a mean outpatient expense in 1981-1983 that was equal to its mean outpatient expense in 1984 was rejected at $p<.001$ using a two way repeated measures analysis of variance with a Greenhouse-Geisser adjustment. The same type of test resulted in rejection at $p<.001$ of the hypotheses that: (1) each claimant cohort would have a mean number of outpatient visits in 1981-1983 that was equal to its mean number of outpatient visits in 1984; (2) each claimant cohort would have a mean number of outpatient physician visits in 1981-1983 that was equal to its mean number of outpatient physician visits in 1984; and (3) each claimant cohort would have an outpatient prescription drug rate in 1981-1983 that was equal to its outpatient prescription drug rate in 1984.

Figure 9

MEAN OUTPATIENT EXPENSE IN 1981-1984 BY EXPENSE CATEGORY IN 1984

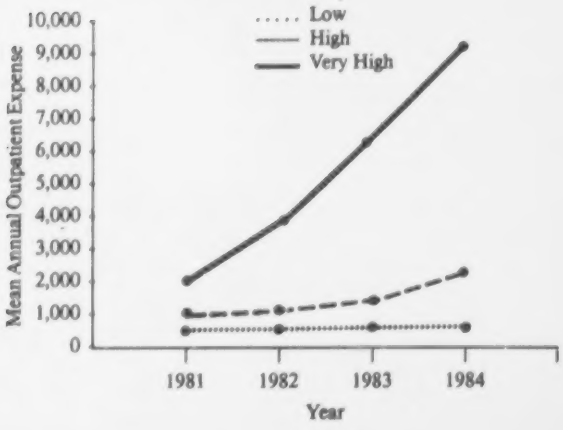

Figure 10

MEAN OUTPATIENT EXPENSE IN BASE YEAR PLUS FIRST PRIOR AND SUBSEQUENT YEARS BY EXPENSE CATEGORY IN BASE YEAR

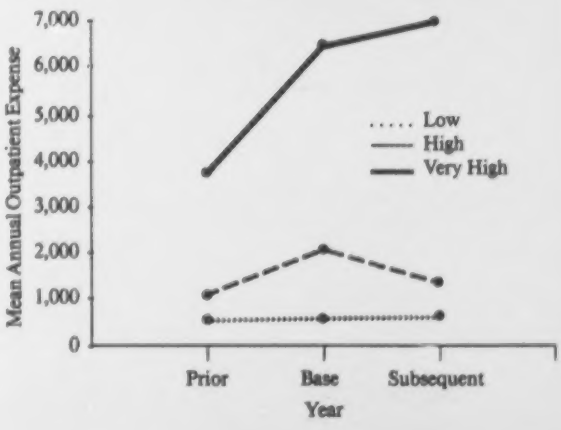

Table XXIII

DISTRIBUTION OF TOTAL EXPENSES BY MAJOR DIAGNOSTIC CATEGORY FOR HIGH COST AND VERY HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981		1982		1983		1984	
	High Cost (%)	Very High Cost (%)	High Cost (%)	Very High Cost (%)	High Cost (%)	Very High Cost (%)	High Cost (%)	Very High Cost (%)
1. Infectious and parasitic diseases (001-139)	1.17	1.90	0.70	1.28	0.78	0.57	1.04	0.17
2. Neoplasms (140-239)	8.99	14.30	10.52	8.80	10.70	16.45	10.80	11.31
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	2.87	2.87	2.16	4.35	1.91	5.12	1.48	4.61
4. Mental disorders (290-319)	3.42	15.91	4.83	3.43	4.92	1.89	6.05	1.64
5. Diseases of the nervous system and sense organs (320-389)	4.91	1.54	4.32	1.74	4.12	3.72	3.71	4.00
6. Diseases of the circulatory system (390-459)	9.35	21.84	7.76	27.32	8.49	30.38	7.21	24.20
7. Diseases of the respiratory system (460-519)	4.27	2.17	4.25	5.25	3.74	2.98	4.35	3.63
8. Diseases of the digestive system (520-579)	10.44	3.05	9.18	7.13	9.36	7.87	8.69	5.62
9. Diseases of the genitourinary system (580-629)	15.30	3.51	13.41	4.76	12.43	3.52	10.19	4.70
10. Complications of pregnancy, childbirth and the puerperium (630-679)	11.02	0.12	13.69	0.05	14.48	0.34	16.29	0.22
11. Diseases of the skin and subcutaneous tissue (680-709)	1.18	0.87	0.96	0.93	0.73	0.38	0.97	0.50
12. Diseases of the musculoskeletal system and connective tissue (710-739)	8.21	5.71	7.43	5.53	7.08	2.51	9.84	4.08
13. Congenital anomalies (740-759)	0.49	0.21	0.55	1.60	0.53	1.07	0.57	1.84
14. Certain conditions originating in the perinatal period (760-779)	1.18	8.75	0.93	3.78	1.14	5.35	1.59	16.49
15. Symptoms, signs and ill-defined conditions (780-799)	10.70	11.14	12.25	12.59	12.55	11.19	10.45	11.17
16. Injury and poisoning (800-999)	6.50	6.11	7.08	11.46	7.03	6.68	6.76	5.80

Table XXIV

ADMISSION EXPERIENCE OF HIGH COST AND VERY HIGH COST CLAIMANTS 1981-1984

	1981		1982		1983		1984	
High Cost Claimants With:	N	Percent	N	Percent	N	Percent	N	Percent
0 admissions	79	5.34	98	5.64	129	7.15	113	7.42
1 admission	1,078	72.84	1,249	71.82	1,302	72.13	1,124	73.80
2 or more admissions								
With same MDC[1]	165	11.15	178	10.24	171	9.47	134	8.80
With different MDCs[1]	158	10.68	214	12.31	203	11.25	152	9.98
All high cost claimants*	1,480	100.01	1,739	100.01	1,805	100.00	1,523	100.00
Very High Cost Claimants With:								
0 admissions	14	8.24	15	8.62	17	8.42	12	8.39
1 admission	43	25.29	49	28.16	57	28.22	33	23.08
2 or more admissions								
With same MDC[1]	69	40.59	49	28.16	52	25.74	46	32.17
With different MDCs[1]	44	25.88	61	35.06	76	37.62	52	36.36
All very high cost claimants*	170	100.00	174	100.00	202	100.00	143	100.00

1. MDC = major diagnostic category.
*Percents may not total to 100.00 due to rounding error.

Table XXV

DISTRIBUTION OF ADMISSIONS, PATIENT DAYS AND INPATIENT EXPENSES BY MAJOR DIAGNOSTIC CATEGORY FOR HIGH COST AND VERY HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981			1982			1983			1984		
	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses
1. Infectious and parasitic diseases (001-139)	1.43	1.67	1.32	0.75	0.88	0.76	0.65	0.88	0.85	0.80	0.73	0.69
2. Neoplasms (140-239)	9.46	8.13	8.66	10.13	9.53	10.76	10.29	10.04	11.02	9.99	9.39	10.97
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	3.14	3.57	3.04	2.25	2.33	2.08	1.91	1.81	1.78	1.88	1.61	1.37
4. Mental disorders (290-319)	2.31	6.52	2.73	3.33	10.81	4.51	3.59	11.01	4.45	4.91	15.90	6.12
5. Diseases of the nervous system and sense organs (320-389)	5.06	3.83	5.04	4.69	3.57	4.25	4.29	2.98	4.18	3.42	2.94	3.34
6. Diseases of the circulatory system (390-459)	9.46	8.23	9.52	8.35	7.96	8.30	8.48	8.48	9.49	7.19	6.83	7.92
7. Diseases of the respiratory system (460-519)	5.39	4.94	4.55	5.11	4.76	4.35	4.61	3.70	3.77	5.82	4.42	4.31
8. Diseases of the digestive system (520-579)	11.28	12.36	12.04	9.99	10.54	10.64	11.09	12.32	11.21	9.36	10.10	10.24
9. Diseases of the genitourinary system (580-629)	17.27	16.68	17.12	14.87	13.63	14.94	14.16	12.66	13.73	11.36	9.62	10.75
10. Complications of pregnancy, childbirth and the puerperium (630-679)	13.86	11.05	12.94	17.26	12.91	16.08	19.38	14.83	17.34	21.92	16.53	20.12
11. Diseases of the skin and subcutaneous tissue (680-709)	1.54	1.36	1.22	0.89	0.91	0.76	0.65	0.72	0.63	0.97	1.03	0.82
12. Diseases of the musculoskeletal system and connective tissue (710-739)	8.47	8.80	8.98	7.04	7.07	7.78	6.71	6.84	7.74	9.59	8.97	11.02
13. Congenital anomalies (740-759)	0.39	0.35	0.52	0.56	0.40	0.55	0.47	0.35	0.52	0.63	0.58	0.64
14. Certain conditions originating in the perinatal period (760-779)	0.88	1.21	1.43	0.84	1.42	1.13	0.84	1.48	1.39	1.37	2.13	2.01
15. Symptoms, signs and ill-defined conditions (780-799)	4.29	4.45	4.30	6.89	6.12	6.04	5.96	4.87	4.74	3.94	2.74	3.01
16. Injury and poisoning (800-999)	5.78	6.85	6.62	7.04	7.15	7.08	6.94	7.02	7.16	6.85	6.49	6.68

Table XXVI

DISTRIBUTION OF ADMISSIONS, PATIENT DAYS AND INPATIENT EXPENSES BY MAJOR DIAGNOSTIC CATEGORY FOR VERY HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981			1982			1983			1984		
	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses	% of Admis.	% of Days	% of IP Expenses
1. Infectious and parasitic diseases (001-139)	1.40	2.29	2.12	1.23	1.73	1.33	1.63	1.03	0.63	0.79	0.29	0.17
2. Neoplasms (140-239)	21.50	13.16	15.54	17.40	9.74	8.79	23.67	20.61	17.50	20.79	13.13	10.64
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	3.04	1.84	2.36	6.37	4.20	4.04	6.12	7.48	4.75	5.26	6.23	5.20
4. Mental disorders (290-319)	14.72	36.46	17.62	2.94	8.59	3.62	2.24	4.26	1.86	2.63	4.14	1.66
5. Diseases of the nervous system and sense organs (320-389)	2.34	1.86	1.09	2.21	1.22	1.38	2.24	2.38	3.67	4.47	3.98	3.95
6. Diseases of the circulatory system (390-459)	25.70	11.09	23.75	25.25	21.52	31.09	27.96	22.33	34.60	19.47	18.90	27.10
7. Diseases of the respiratory system (460-519)	3.27	1.97	2.45	4.17	5.66	5.90	4.69	4.35	3.28	4.74	3.51	3.95
8. Diseases of the digestive system (520-579)	3.27	2.83	3.37	8.58	9.60	8.13	9.18	8.24	8.96	8.95	7.38	6.27
9. Diseases of the genitourinary system (580-629)	4.21	3.16	3.56	6.62	4.35	4.83	5.92	4.18	3.48	9.74	6.63	4.84
10. Complications of pregnancy, childbirth and the puerperium (630-679)	0.23	0.08	0.14	0.25	0.03	0.04	0.61	0.68	0.38	0.79	0.29	0.23
11. Diseases of the skin and subcutaneous tissue (680-709)	1.17	1.25	0.91	1.72	1.32	0.98	0.82	0.66	0.38	0.79	1.31	0.54
12. Diseases of the musculoskeletal system and connective tissue (710-739)	6.07	6.58	6.34	6.37	5.34	5.83	3.06	3.68	2.45	5.53	4.46	4.49
13. Congenital anomalies (740-759)	0.23	0.22	0.22	1.72	1.45	1.85	0.82	1.04	1.25	1.32	1.83	1.97
14. Certain conditions originating in the perinatal period (760-779)	3.27	5.47	9.90	2.45	4.12	4.44	2.65	6.04	6.27	1.84	9.15	19.14
15. Symptoms, signs and ill-defined conditions (780-799)	5.37	4.83	4.10	6.13	4.83	5.07	4.49	4.69	3.49	6.32	10.23	3.42
16. Injury and poisoning (800-999)	4.21	6.90	6.56	6.62	16.29	12.69	3.88	8.36	7.04	6.58	8.51	6.44

Table XXVII

AVERAGE CHARGE PER ADMISSION IN EACH MAJOR DIAGNOSTIC CATEGORY FOR HIGH COST AND VERY HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981		1982		1983		1984	
	High Cost ($)	Very High Cost ($)	High Cost ($)	Very High Cost ($)	High Cost ($)	Very High Cost ($)	High Cost ($)	Very High Cost ($)
1. Infectious and parasitic diseases (001-139)	5,443	25,494	6,138	17,879	7,855	6,933	5,334	3,820
2. Neoplasms (140-239)	5,400	12,202	6,430	8,290	6,429	13,335	6,739	9,220
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	5,720	13,092	5,593	10,402	5,597	14,004	4,473	17,785
4. Mental disorders (290-319)	6,983	20,201	8,205	20,185	7,443	14,967	7,658	11,378
5. Diseases of the nervous system and sense organs (320-389)	5,883	7,841	5,480	10,269	5,862	29,527	5,990	15,916
6. Diseases of the circulatory system (390-459)	5,936	15,597	6,018	20,212	6,723	22,327	6,757	25,075
7. Diseases of the respiratory system (460-519)	4,981	12,628	5,151	23,248	4,906	12,614	4,540	15,037
8. Diseases of the digestive system (520-579)	6,302	17,377	6,444	15,553	6,072	17,598	6,714	12,628
9. Diseases of the genitourinary system (580-629)	5,850	14,292	6,081	11,992	5,824	10,605	5,807	8,962
10. Complications of pregnancy, childbirth and the puerperium (630-679)	5,510	9,877	5,641	2,512	5,373	11,173	5,634	5,163
11. Diseases of the skin and subcutaneous tissue (680-709)	4,657	13,182	5,131	9,352	5,828	8,393	5,211	12,292
12. Diseases of the musculoskeletal system and connective tissue (710-739)	6,255	17,602	6,690	15,005	6,929	14,436	7,052	14,639
13. Congenital anomalies (740-759)	7,929	15,677	5,923	17,744	6,684	27,529	6,221	26,938
14. Certain conditions originating in the perinatal period (760-779)	9,558	51,059	8,113	29,708	9,990	42,642	9,022	187,214
15. Symptoms, signs and ill-defined conditions (780-799)	5,910	12,866	5,301	13,572	4,778	14,029	4,684	9,749
16. Injury and poisoning (800-999)	6,762	26,315	6,089	31,485	6,197	32,769	5,984	17,634
All major diagnostic categories	5,902	16,877	6,053	16,414	6,005	18,040	6,138	18,011

Table XXVIII

DISTRIBUTION OF OUTPATIENT VISITS, PHYSICIAN VISITS AND EXPENSES BY MAJOR DIAGNOSTIC CATEGORY FOR HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981			1982			1983			1984		
	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses
1. Infectious and parasitic diseases (001-139)	0.92	0.99	0.57	0.71	0.73	0.46	0.85	0.98	0.49	1.74	2.03	2.27
2. Neoplasms (140-239)	9.01	10.50	10.40	5.19	6.90	9.54	5.90	7.14	9.54	5.45	7.01	10.20
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	2.62	3.27	2.17	2.31	2.93	2.46	2.36	2.98	2.39	2.70	3.47	1.84
4. Mental disorders (290-319)	10.61	9.43	6.25	12.61	10.83	6.10	13.57	11.70	6.67	12.77	9.30	5.81
5. Diseases of the nervous system and sense organs (320-389)	4.05	4.22	4.33	4.51	5.10	4.59	2.67	3.14	3.91	3.92	4.60	5.02
6. Diseases of the circulatory system (390-459)	8.75	8.64	8.69	6.64	6.60	5.59	5.89	6.75	4.80	6.75	7.22	4.73
7. Diseases of the respiratory system (460-519)	8.09	10.09	3.11	8.32	10.92	3.84	7.19	9.03	3.65	8.06	10.26	4.51
8. Diseases of the digestive system (520-579)	3.31	3.98	3.82	3.29	4.22	3.39	2.58	3.23	2.52	3.06	3.94	3.26
9. Diseases of the genitourinary system (580-629)	7.04	8.73	7.72	6.59	8.75	7.31	6.58	8.40	7.60	6.91	8.91	8.23
10. Complications of pregnancy, childbirth and the puerperium (630-679)	1.33	1.42	3.05	1.74	1.72	4.17	2.02	2.08	3.91	1.05	1.27	2.84
11. Diseases of the skin and subcutaneous tissue (680-709)	2.74	2.95	1.03	3.37	3.43	1.76	2.32	2.58	1.10	4.96	6.21	1.48
12. Diseases of the musculoskeletal system and connective tissue (710-739)	8.89	6.83	5.00	8.89	6.70	6.06	6.57	5.42	4.66	9.15	6.40	5.71
13. Congenital anomalies (740-759)	0.45	0.33	0.38	0.30	0.29	0.57	0.55	0.69	0.57	0.23	0.30	0.36
14. Certain conditions originating in the perinatal period (760-779)	0.16	0.21	0.14	0.13	0.17	0.11	0.24	0.29	0.20	0.14	0.13	0.11
15. Symptoms, signs and ill-defined conditions (780-799)	22.70	22.14	37.30	23.49	22.46	36.99	28.02	27.95	41.39	20.56	20.82	36.56
16. Injury and poisoning (800-999)	9.39	6.23	5.99	11.89	8.23	7.07	12.68	7.61	6.56	12.52	8.10	7.06

Table XXIX

DISTRIBUTION OF OUTPATIENT VISITS, PHYSICIAN VISITS AND EXPENSES BY MAJOR DIAGNOSTIC CATEGORY FOR VERY HIGH COST CLAIMANTS 1981-1984

Major Diagnostic Category (ICD Codes)	1981			1982			1983			1984		
	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses	% of Visits	% of MD/DO Visits	% of OP Expenses
1. Infectious and parasitic diseases (001-139)	1.52	0.73	0.52	0.64	0.63	0.97	0.48	0.57	0.25	0.87	0.99	0.19
2. Neoplasms (140-239)	4.46	5.46	6.56	7.86	8.79	8.84	11.41	12.83	10.57	9.81	11.12	15.25
3. Endocrine, nutritional and metabolic diseases, and immunity disorders (240-289)	2.92	3.30	6.10	3.98	4.44	6.13	4.70	5.56	7.20	4.44	5.21	1.22
4. Mental disorders (290-319)	17.57	18.25	5.21	7.83	7.24	2.37	8.62	8.21	2.02	6.43	3.40	1.51
5. Diseases of the nervous system and sense organs (320-389)	4.60	4.93	4.37	3.39	2.86	3.78	2.49	1.83	4.01	2.44	2.75	4.30
6. Diseases of the circulatory system (390-459)	13.69	11.21	9.89	13.59	14.07	5.99	15.30	13.69	6.63	8.89	8.15	7.33
7. Diseases of the respiratory system (460-519)	1.47	1.78	0.44	3.96	4.47	1.53	4.53	5.21	1.27	3.09	3.42	1.75
8. Diseases of the digestive system (520-579)	2.59	2.95	1.09	3.54	3.96	1.50	2.14	2.51	1.74	3.36	3.82	1.83
9. Diseases of the genitourinary system (580-629)	4.13	4.20	3.20	5.96	6.71	4.35	5.84	6.88	3.73	6.59	7.56	3.85
10. Complications of pregnancy, childbirth and the puerperium (630-679)	—	—	—	0.08	0.09	0.11	0.17	0.21	0.11	0.22	0.25	0.15
11. Diseases of the skin and subcutaneous tissue (680-709)	1.28	0.99	0.60	1.44	1.55	0.63	1.23	1.28	0.35	1.91	2.18	0.29
12. Diseases of the musculoskeletal system and connective tissue (710-739)	5.91	5.02	1.82	5.55	5.10	3.87	3.33	2.06	2.82	2.75	2.15	1.72
13. Congenital anomalies (740-759)	0.86	1.08	0.18	0.46	0.42	0.15	0.04	0.05	0.07	0.60	0.48	1.13
14. Certain conditions originating in the perinatal period (760-779)	3.71	4.64	1.59	0.31	0.36	0.06	0.42	0.50	0.15	0.41	0.48	1.03
15. Symptoms, signs and ill-defined conditions (780-799)	28.94	32.09	55.12	34.78	35.68	55.24	34.87	35.96	54.46	43.84	45.63	56.33
16. Injury and poisoning (800-999)	6.31	3.33	3.29	6.63	3.64	4.48	4.41	2.65	4.63	4.23	2.32	2.09

Section XI

Policy Implications

In addressing the policy issues pertaining to high cost illness in the general population, the first priority is to assure that the families of high cost patients are able to pay for their medical expenses without experiencing excessive financial burden. In response to that priority, most of the earlier studies of high cost patients concentrated on estimating the incidence of catastrophic illness in the population and determining its impact on affected families and various public and private financing programs.

The subpopulation of interest to the research—nonelderly, middle income workers and their families—is typically much better protected from high cost medical expenses than other segments of the population. Particularly well secured as a group are employees who are covered by the medical plan of a medium or large employer. Over three-quarters of these employees and their families are safeguarded from excessive medical expenditures through a stop-loss provision in their major medical coverage (Department of Health and Human Services, 1986). Such was the case for the employees of the company which made available its data for this study. Members of the company's self-insured fee-for-service medical plan had their out-of-pocket medical expenses limited annually to $1,000, plus the deductible and any amounts exceeding the established benefit limits. While not a trivial sum, particularly for the lower paid members of this workforce, that amount was probably reasonable for most of the employee plan members. Three-fourths of these employees were female and 60% were married, suggesting the availability of two incomes in many cases.

When financial access for high cost patients in employment-related group medical plans is reasonably well assured, attention can be directed toward other significant issues pertaining to these patients. Irrespective of whether one is a public health professional seeking to promote health and prevent disease in the population, and assure that limited resources are allocated equitably and cost effectively, or an employer attempting to manage its health care costs by reducing the incidence of high cost illness in its medical plan, three questions are important to answer:

1. To what degree are the diseases and conditions from which the high cost patients suffer preventable?
2. Can individuals with a high likelihood of becoming high cost patients be identified and intervened with to prevent that occurrence?
3. Are the services being provided to high cost patients medically necessary and appropriate—i.e., at the lowest level of intensity required for a good outcome?

The dissertation research profiled the high cost and very high cost patients in a large self-insured medical plan in terms of their demographics, leading health problems, and expenses and utilization—both within the high cost year and over a period of prior and subsequent years. In doing so, it provided at least partial answers to those questions.

Below, the implications of the research findings are addressed with respect to two broad areas: (1) disease prevention and health promotion and (2) case management services. The interventions suggested within each of these areas are directed toward employers and other private sponsors of group medical plans. However, it is possible that many of the recommended interventions would

apply to the government (state or national) if it were to sponsor a comprehensive health insurance program.

Disease Prevention/Health Promotion

Diseases of the circulatory system and neoplasms were the two leading health problems of the very high cost patients, accounting for 22% to 30% of expenses and 40% to 52% of hospital admissions for individuals in this expense category. These diseases—many of which are eminently preventable through attention to lifestyle and reduction of risk factors such as high blood pressure, smoking, not exercising regularly and elevated cholesterol—also figured prominently among the leading health problems of patients whose annual expenses were between $5,000 and $25,000. For the combined group of high and very high cost patients, circulatory diseases and cancer were responsible for $5.3 to $8.0 million in medical expenses annually—about one-fourth to one-third of total expenses for these patients.

Other companies have reported even larger percentages of expenses in their plans being devoted to these illnesses. For example, Tenneco has claimed that in its largest insurance plan, cancer and heart disease accounted for 58% of total expenditures (Channell and Bernacki, 1985). Whitted and Torrens (1985) have noted that at Ford's general headquarters, heart attacks represented 29% of total medical expenses. Polakoff (1982) estimated that more than $700 million is spent by employers each year to replace men ages 40 to 64 years who have suffered from coronary heart diseases.

Employers can help reduce the incidence of heart disease, stroke and cancer among employees and their families in at least three ways: (1) offering a comprehensive health promotion program to employees and their families; (2) offering periodic examinations at the worksite, whose content and frequency are dictated by employee age, gender, medical history and health risk characteristics; and (3) adding coverage for a carefully defined set of preventive services to their benefit plans. Each of these options is explored here.

Many employers currently sponsor one or more health promotion/disease prevention *activity* for their employees. For example, a 1982 survey of California employers with more than 100 employees found that 78% of these employers offered one or more health promotion activity (broadly defined) (Fielding & Breslow, 1983). A much smaller percentage of employers, however, provide wellness *programs* that are planned; targeted to one or more specific risk factor and risk group; offered year-round; evaluated on the basis of predetermined criteria; and supported by the work environment.

Information furnished by this study of high cost patients validates the need for employer-sponsored health promotion programs, and highlights appropriate targets for risk reduction efforts. For example, the research found that males 50 to 64 years accounted for three to five times as many very high cost patients as expected. This suggests that the greatest benefit of risk reduction endeavors in the population studied would be achieved by focusing on older males. However, given that it may take several years to reduce an individual's risk factors for heart disease, stroke and certain cancers, it is appropriate to target middle-aged males as well.

The research also found that among patients whose annual medical expenses were $25,000 or higher, male *spouses* were most overrepresented. This finding demonstrates the need to make health promotion programs available (and effectively marketed) to spouses as well as employees, particularly with predominantly female workforces.

In deciding whether to sponsor a wellness program, whose impact on the incidence of heart disease or cancer in the population probably won't be observed for several years, employers may be concerned that their employees are not employed with the company long enough to make an investment in prevention worthwhile. The employees of the company providing its data for this study did in fact have a fairly high annual turnover rate. However, the employees that were most apt to terminate employment quickly (either voluntarily or nonvoluntarily) were the youngest members of the workforce and, therefore, probably the employees with the lowest overall risk. Despite high annual turnover rates, the average employee plan member had been with the company for at least ten years, and those employees who actually used services under The Plan had been with the company even longer. (It should be noted, however, that employee plan members who had been with the company for less than one year were not part of the study group.)

Another option available to at least some large

employers for preventing heart disease, cancer and stroke, as well as other diseases and conditions, is to offer periodic examinations to employees at the workplace. Periodic examinations of the "well" population (such as a group of healthy workers) are designed to detect diseases (or precursors of diseases), which are important causes of illness, disability or death before the onset of symptoms. For a disease to be included in a periodic examination, treatment in the asymptomatic stage should result in a substantially improved outcome over treatment initiated after the manifestation of symptoms. In addition, the tests used for screening must be acceptable to the target population; accurate (i.e., a sufficiently low percentage of false positives and false negatives); relatively inexpensive; and easy to administer, preferably by paramedical personnel with guidance and interpretation by physicians and/or nurses. Finally, appropriate followup of positive findings is imperative (Alexandre, 1982; Fielding & Alexandre, 1984).

Screening for heart disease, stroke and certain (but not all) cancers as part of a periodic examination is defensible. The visible onset of these chronic diseases is usually preceded by a lengthy asymptomatic period, and by the time these conditions make themselves known, the patient's prognosis frequently cannot be altered. Heart disease, for example, often announces its presence through a heart attack, and many first heart attacks are fatal (Fielding, 1984b). In addition, the screening tests available for these diseases are acceptable to the population, quite accurate and relatively low cost (in most cases), and many of them can be administered by nonphysician health professionals.

For employers with large concentrations of employees at one or more worksites, good medical leadership (particularly in the area of preventive medicine) and strong employee confidence in the medical department, offering a periodic examination at the worksite has a number of distinct advantages over paying for this type of service in the community. Among these advantages are the ability to control the content and frequency of the examination, the ability to check with an employee to assure that necessary followup for positive tests has occurred, and the fact that health assessments can often be done less expensively and faster at the worksite than in the community (Fielding & Alexandre, 1984).

Offering a periodic examination at the worksite is, however, an extremely complex undertaking that probably is not appropriate for many employers, particularly those who have widely dispersed workforces (such as the employer whose data was analyzed for this research). An easier approach for these employers, and one that reaches spouses and children as well as employees, is to carefully establish a finite set of preventive health services that will be covered under the medical plan.

Selection of the screening procedures and services to be covered should be guided by epidemiologic and clinical criteria. Breslow and Somers (1977) used such criteria to identify specific health goals and professional services (including screening tests and patient education/counseling) appropriate for ten different age groups. Over the past decade, their Lifetime Health Monitoring Program has been further developed and refined by groups including the Institute of Medicine's Ad Hoc Advisory Group on Preventive Services, the Canadian Task Force on the Periodic Health Examination and the INSURE/Lifecycle Project. Although the specific recommendations of these groups differ somewhat, they share the same objective—to assure that health promotion and early (disease) detection services provided to the population are based on age, gender and health risks.

Most insurance companies and self-administered employers currently would have a difficult time administering (i.e., processing claims and paying benefits) a preventive services benefit based on the Lifetime Health Monitoring Program, or a similarly comprehensive set of recommendations. This is because most claims processing systems are not sufficiently sophisticated to keep track of the multitude of tests and procedures approved for reimbursement in each age group. As an alternative, employers might wish to specify several key preventive procedures that will be covered by their plans, and the frequency with which they will be covered (e.g., annually, every other year, etc.) for each age group. An excellent starting place might be the cancer screening tests recommended by the American Cancer Society (1980).

An extremely important area of prevention that has not yet been discussed is prenatal care. While prenatal services are routinely covered by most medical plans, there are good reasons for employers to provide extra incentives for employees (or their spouses) to obtain prenatal services as early as possible in a pregnancy. According to Sara Rosenbaum (1987) of the Children's Defense Fund, about 6% of

all newborns in this country require intensive care at birth, and one-third of the infants hospitalized at birth will be rehospitalized twice for an average of 16 days during their first year of life.

In The Plan analyzed for the dissertation, between 4.5% and 7.6% of all *infant claimants* had annual expenses of at least $5,000; 1% to 2% had expenses of $25,000 or higher. (Newborns are not automatically claimants unless they remain in the hospital beyond the date that the mother is discharged, so "infant claimant" does not necessarily translate into "newborn." However, The Plan did pay for well baby services beginning in 1984; in that year, infant claimants is probably a fairly close approximation of newborns.) These high and very high cost infants (32 to 44 each year) represented just 2% to 3% of all high and very high cost patients, but they were responsible for 3% to 9% of total expenses for that group. In 1984, 38 infants accumulated plan expenses of almost $2 million. In almost every year of the study, perinatal admissions were the most expensive for both the high cost patients ($8,113 to $9,090 per admission) and the very high cost patients ($29,708 to $187,214 per admission). Other studies also have documented the high costs of neonatal intensive care (Kaufman & Shepard, 1982; Pomerance, Ukrainski, Ukra, Henderson, Nash & Meredith, 1978; Schroeder *et al.*, 1979).

Babies born to mothers who have received no prenatal care are three times more likely to be low birth weight than babies born to mothers who did receive such care. Babies born with low birth weight are 40 times more likely than normal weight babies to die in the first 28 days of life, and 20 times more likely to die before their first birthday (Rosenbaum, 1987). The Children's Defense Fund has estimated that 22,000 babies will have died between 1985 and 1990 because their mothers failed to receive early, comprehensive and continuous maternity care; many thousands more will have been left permanently disabled from conditions such as mental retardation; growth and development problems; birth defects; vision and hearing defects; delayed speech; autism; cerebral palsy; epilepsy; learning disability; and chronic lung problems (Rosenbaum, 1987).

Incentives for early and comprehensive prenatal care might include eliminating the deductible and increasing the portion of prenatal services covered by The Plan, for example from 80% to 90%. (Coverage at 100% is not recommended because it would eliminate any financial incentive the employee/spouse would have to select a less expensive obstetrician.) Assuming an average cost for obstetrical care of $2,000, it would have cost The Plan an average of $350 more per newborn (10% × $2,000 + $150 deductible) to provide this type of incentive to its members. In 1984, the incentive (for 737 infants) would have resulted in about $258,000 of extra costs to the employer—around 13% of plan expenses for high and very high cost infants that year. At an average cost of $52,000 in 1984 for each high/very high cost infant, if the incidence of prematurity and other infant diseases could have been reduced by 10% to 15% that year (five cases), the benefits of encouraging prenatal care among plan members would have approximated the associated costs. This calculation does not incorporate the indirect savings to the employer of having employees who would otherwise be parents of premature infants be more productive at work because they are not distracted by the emotional and financial implications of coping with an extremely sick infant.

Irrespective of whether an employer opts to provide additional coverage for prenatal services, it should promote the benefits of early, comprehensive and continuous prenatal care among its employees and their spouses. Some employers, such as Los Angeles-based Unocal Corporation, have developed booklets for their employees educating them about the important factors (e.g., age, genetic background, nutrition, infection, the physical and chemical environment) that influence the health of the fetus during pregnancy. Any health education materials pertaining to pregnancy should also include strong encouragement of early prenatal care.

A particularly important topic to discuss in any educational materials developed about pregnancy is that of Cesarean section vs. vaginal deliveries. The Plan investigated for this study experienced a steady rise in its Cesarean section rate, from 24.4% in 1982 to 27% in 1984. (The national Cesarean section rate in 1984 was 22%.) The hospital costs of Cesarean section deliveries were almost double the costs of vaginal deliveries under The Plan.

A recent comparison of national Cesarean section rates in 19 countries found that the United States had the highest rate. With the exception of Australia and Canada, the U.S. Cesarean section rate was 50% to 200% above that of the other coun-

tries. The largest difference between countries in their practices regarding Cesarean sections was in the percentage of women who had a vaginal birth after a previous Cesarean section (VBACS). Of eight countries with information on the percentage of women with VBACS, the lowest rates were found in Canada (4%) and the U.S. (5%). The VBACS rate in the other six countries ranged from 10% (New Zealand) to 43% (Norway) (Notzon, Placek & Taffel, 1987).

Despite a historical norm of "once a section, always a section," there is growing scientific evidence and acceptance among obstetricians in the U.S. that many women who have had one or more Cesarean section do not require their subsequent children to be delivered in this manner (Farmakides, Duvivier, Schulman, Schneider & Biordi, 1987; Jarrell, Ashmead & Mann, 1985; Silver & Gibbs, 1987). The American College of Obstetrics and Gynecology (1985) recently recommended that women with one previous Cesarean section be allowed a trial of labor. In a five year study of vaginal delivery after Cesarean section, Jarrell *et al.* (1985) reported that two-thirds of 216 women with previous Cesarean section who underwent a trial of labor experienced successful vaginal delivery. This percentage was comparable to what had been previously reported in a review of the English literature from 1950 through 1980 (Lavin, Stephens, Miodovnik & Barden, 1982).

Many women are unaware that vaginal birth is an option after a Cesarean section; often they just assume that another Cesarean section is required—not surprising given the extremely low percentage of VBACS for the U.S. reported above. Employers should encourage pregnant women who have had a previous Cesarean section to explore the possibilities of a vaginal delivery with their obstetricians. Not only are the costs of a vaginal delivery substantially lower than the costs of a Cesarean section, vaginal delivery avoids a major surgery and its associated health risks. In addition, the recovery period for the mother is usually much shorter with a vaginal delivery.

Case Management Services

Unlike health promotion and disease prevention programs, which proactively address the health behaviors and risks of a basically "well" population to avoid future illness, catastrophic case management programs are reactive in nature—initiated in response to an individual's illness. Case management programs are a relatively recent addition to private sector health care cost management efforts. According to Henderson and Wallack (1987, p. 7), "The objective of most case management programs is to coordinate and organize health care resources to address specific medical problems and psychosocial needs of patients and families." Most programs are so new, however, that it is impossible to know how close they come to meeting that objective in a cost effective manner, or how satisfied patients and their families have been with the case management process.

It is commonly recognized that the earlier patients are identified as being potentially high cost cases, the greater the opportunities for case managers to intervene successfully (Delaney & Aquilina, 1987; Henderson & Wallack, 1987; Mazoway, 1987). Currently, case managers become involved with a patient in one of two ways. Either a utilization review (UR) nurse contacts the case manager upon reviewing an admission (or a request for an admission) for a diagnosis which is on a predetermined list of potentially high cost diagnoses (e.g., organ transplant, severe trauma, heart attack), or the claims processor communicates with the case manager when the total claims for one patient exceed a specific dollar threshold (e.g., $10,000 or $25,000). Sometimes, additional criteria are built into the UR process to identify high cost cases. For example, case management services might be initiated when the length of stay exceeds a certain number of days, the primary or secondary diagnosis indicates complications or there is a repeat admission within a certain time interval.

Henderson and Wallack (1987), who are currently conducting an evaluation at Brandeis University of the catastrophic case management program of a major insurance company, suggest that notification by the utilization review nurse is preferred over advisement by the claims processor since it begins the case management process much earlier. Communication at the time of an admission enables the case manager to become involved before excessive charges are incurred in what may not even be the most appropriate facility for the patient. This approach, however, suffers from the basic premise that all high cost patients experience hospitalization. As shown in this study, that is *not* the

case. Each year, 5% to 7% of patients with expenses of $5,000 to $25,000, and 8% of those whose annual expenses exceeded that level, did not have a hospital admission. On the other hand, case management services that are initiated through claims processing are inherently flawed in that they are triggered by a level of expenditures that is already so high there may be little the case manager can do to alter the course of treatment or the patient's outcome.

Data from this investigation suggest that multiple methods of identifying high cost and potentially high cost patients are probably necessary for case management services to achieve their full potential. For an acute trauma case, such as an injury sustained in an automobile accident or severe burns, initiation of case management through the utilization review process is very appropriate, since it will involve the case manager at the earliest point possible. For those individuals who have chronic health problems and use many outpatient services over a prolonged period, however, the two approaches to case management presented thus far are extremely reactive in nature and far from optimal.

Based on findings from the longitudinal analyses of expenses and utilization of high cost patients conducted in this dissertation, there is good reason to suspect that a more proactive case management approach could be designed. Instead of waiting for patients to exceed a certain level of claims expense or to be admitted to the hospital, it might be possible to use claims data—such as diagnostic and demographic information—to identify patients with a strong likelihood of becoming very high cost and then intervene as necessary (and appropriate) to prevent that occurrence.

This conclusion was reached by two key observations in the longitudinal data. First, in the year immediately following their base high cost year, patients whose annual expenses were between $5,000 and $25,000 had a hospital admission rate that was virtually identical to their admission rate in the first year prior to the base. This suggested that the majority of illnesses and conditions for which the high cost patients were hospitalized were acute events, a perception that was supported to at least a certain extent by the diagnostic data. Pregnancy and genitourinary disorders were the two leading causes of admission for these patients in their high cost year.

Without additional information, one might suspect that over time the high cost patients typically are low cost patients (or nonusers), who simply experience a one-time high cost event and then return to their original low levels of utilization. However, the second important finding was that three years prior and three years after being categorized as high cost, this group of patients had a mean expense that was two to three times the mean expense of patients who were categorized as low cost. This demonstrated that the high cost patients *as a group* were distinct from the low cost patients. Individually, many of the high cost patients—such as those having babies—were probably low cost patients (or nonusers) in the years prior and subsequent to their high cost year. At the same time, however, there had to have been a number of patients in the high cost cohort with levels of utilization and expense sufficiently high over a period of years to result in levels of use and expense for the entire high cost cohort that were substantially above those for the low cost cohort.

It is this latter group of patients who would be worth studying further to identify their health problems and longitudinal utilization patterns. As a group, these patients either maintained a steady high level of expenses over a several year period, or many of them became very high cost in one year or more. By eliminating from the high cost cohort those patients who were pregnant or had other clearly identifiable one-time acute events (e.g., a surgery such as a hysterectomy or an appendectomy), the remaining patients might be excellent candidates for early intervention efforts through case management.

After identifying the diagnoses associated with this special group of high cost patients, the next step would be to assess the potential for early intervention to prevent future very high cost events in each of the relevant diagnostic categories. Diagnostic screens could then be added to the claims processing system so that a case manager would automatically be contacted for those types of cases where the potential for prevention and savings is considered to be high. While this approach does not avoid the onset of disease, it is certainly more proactive than waiting for high cost patients to be admitted to the hospital or to incur a high level of claims expense.

Section XII

Directions for Future Research

Based on the preceding discussion, a high priority for future research in this area should be to characterize that small group of high cost patients with a strong likelihood of becoming very high cost. Understanding the nature of the health problems of these individuals and the manner in which they use services may lead to interventions that would prevent their health problems from becoming more serious and very high cost.

Another priority for future research is the development of models for predicting which patients or plan members will be low cost, high cost or very high cost. The results from this study suggest some variables that would be appropriate to include in a multivariate analysis and also provide some clues as to what might be observed in the findings.

The purpose of predicting which patients will incur what levels of expense is to identify appropriate targets for interventions to prevent high cost illness. The ability to predict which individuals will become high and very high cost patients, however, raises serious ethical and political considerations that must not be overlooked in designing future research studies. It is essential that these types of data not be used to discriminate against employees who are either high cost themselves, or who have a dependent that is high cost. While there is probably no absolute safeguard against this type of discrimination, if that is an employer's objective, the likelihood of it occurring can be minimized through careful attention to patient confidentiality in claims processing and by keeping all case management services independent of the employer.

Another priority for future study is to refine the diagnostic information derived in this research by splitting the major diagnostic categories into smaller, more clinically meaningful groups. For example, it would be useful to know what percentage of diseases of the circulatory system—the leading health problem of the very high cost patients—were preventable conditions, such as ischemic heart disease and stroke, versus less preventable conditions, such as rheumatic fever. It would also be helpful to identify which particular cancer sites were prominent among the high and very high cost patients, again to assess the potential for prevention.

This study, or a similar investigation, should be repeated in other populations of nonaged, middle income workers and their families to assess the generalizability of the findings. It would be extremely valuable to conduct this research in other types of industries to assure a different mix of employees than present in the company studied. For example, an aerospace company typically has a predominantly older male workforce. It might also be worthwhile to repeat some of the analyses on a random sample of the low cost patients to see if statistical significance would persist with a smaller sample size.

A question whose answer should be pursued by the company furnishing its data to this research is, what percentage of the claimants whose annual expenses were less than $150 in 1984 belonged to a family that had met the *family* deductible? If that percentage was low, then the company might want to consider negotiating a discount on its administrative fee with the claims processor, assuming it can educate employees and their families not to submit their claims until the combined amount at least exceeds the deductible. It would appear to be an unnecessary expense for the company to pay for the processing of

those claims that don't result in any reimbursement to the patient or the provider because the deductible has not yet been met.

Another area worth further exploration is the degree to which an age increase among employee plan members translates into an age increase among the users of services. As seen in this study, from 1981 to 1984 the average age of the employee plan members increased by more than one year, but the average age of the claimants declined by just under one year during the same period of time. This is contrary to intuition and worth additional analysis, particularly since it is commonly assumed that an older group of employees translates into an older claimant population.

Finally, there is clearly a need for additional investigation of catastrophic case management programs. In studying the nature and effects of these programs, careful attention must be given to the *qualitative* as well as the *quantitative* (i.e., cost) issues. For example, it is important to understand the degree to which patients and their families have been willing to participate with and been satisfied by case management services. How successful case managers have been in protecting patient confidentiality is also of great concern. Both of these issues, plus many others, have significant implications for the ability of case management programs to achieve their objectives.

References

A. D. Little, Incorporated. (1975). "Financing of Catastrophically Expensive Health Care: Final Report to National Center for Health Services Research." (Contract No. HSM-110-71-197). Cambridge, MA.

Alexandre, L. M. (1987). "High-Cost Patients in an Employer-Sponsored Fee-For-Service Medical Plan." Unpublished doctoral dissertation. University of California, Los Angeles.

Alexandre, L. M. (1982). "Examining Periodic Exams for Healthy Workers." Unpublished master's project. University of California, Los Angeles.

Alexandre, L. M., and Barter, K. A. (1985). "Helping Employees Become Better Health Care Consumers." *Business and Health* 2 (10), 5-8.

American Cancer Society. (1980). *The Health-Related Checkup.* New York, NY.

Arnett, R. H., Cowell, C. S., Davidoff, L. M., and Freeland, M. S. (1985, Spring). "Health Spending Trends in the 1980's: Adjusting to Financial Incentives." *Health Care Financing Review* 6, 1-26.

Bergthold, L. (1986). "The Business Community as a Promoter of Change." *Business and Health* 3 (3), 39-41.

Berki, S. E., and Ashcraft, M. L. F. (1980). "HMO Enrollment: Who Joins What and Why: A Review of the Literature." *Milbank Memorial Fund Quarterly/Health and Society* 58, 588-632.

Birnbaum, H. (1978). *The Cost of Catastrophic Illness.* Lexington, MA: Lexington Books, D. C. Heath and Company.

Breslow, L., and Somers, A. R. (1971). "The Lifetime Health-Monitoring Program: A Practical Approach to Preventive Medicine." *New England Journal of Medicine* 296, 601-608.

Brook, R. H., Ware, J. E., Rogers, W. H., Keeler, E. B., Davies, A. R., Donald, C. A., Goldberg, G. G., Lohr, K. N., Masthay, P. C., and Newhouse, J. P. (1983). "Does free care improve adults' health?" *New England Journal of Medicine* 309, 1426-1434.

Buchanan, J., and Cretin, S. (1986). *Fee-for-Service Health Care Expenditures: Evidence of Selection Effects Among Subscribers Who Choose HMOs* (R-3341-HHS). Santa Monica, CA: Rand Corporation.

Channell, B., and Bernacki, E. J. (1985). "A PPO for Catastrophic Illness." *Business and Health* 2 (6), 22-23.

Cole, B. M. (1986, May). "The Boom in Health Care Brokers: Preferred Provider Organizations Are the New Elite in the Medical Field." *California Business*, 59-62.

Congressional Budget Office. (1977). *Catastrophic Health Insurance* (Stock No. 052-070-03882-9). Washington, D.C.: U.S. Government Printing Office.

Congressional Budget Office. (1982). *Catastrophic Medical Expenditure Patterns in the Nonelderly, Nonpoor Population.* Washington, D.C.: U.S. Government Printing Office.

Delaney, C., and Aquilina, D. (1987). "Case Management: Meeting the Challenge of High Cost Illness." *Employee Benefits Journal* 12 (1), 2-8.

Department of Health and Human Services. (1986). *Catastrophic Illness Expenses.* Report to the President. Washington, D.C.

Egdahl, R. H., and Walsh, D. C. (Eds.). (1979). *Controlling Health Benefit Costs: The Self-Insurance Option.* New York: Springer-Verlag.

Falk, I. S., Rorem, C. R., and Ring, M. D. (1933). *The Costs of Medical Care.* Publications of the Committee on the Costs of Medical Care: No. 27. Chicago, IL: University of Chicago Press.

Farmakides, G., Duvivier, R., Schulman, H., Schneider, E., and Biordi, J. (1987). "Vaginal Birth After Two or More Previous Cesarean Sections." *American Journal of Obstetrics and Gynecology* 156, 565-566.

Fielding, J. E. (1984a). *Corporate Health Management.* Menlo Park, CA: Addison-Wesley.

Fielding, J. E. (1984b). "Health Promotion and Disease Prevention at the Worksite." *Annual Reviews in Public Health* 5, 237-265.

Fielding, J. E., and Alexandre, L. M. (1984). "Assessing Health: What Can Employers Do?" *Business and Health* 1(4), 5-12.

Fielding, J. E., and Breslow, L. (1983). "Health Promotion Programs Sponsored by California Employers." *American Journal of Public Health* 73, 538-542.

Fox, P. D., and Spies, J. J. (1984). "Alternative Delivery Systems: What Are the Risks?" *Business and Health* 1(3), 5-10.

Goldbeck, W. B. (1984). "Health Care Coalitions." In P. D. Fox, W. B. Goldbeck, and J. J. Spies (Eds.). *Health Care Cost Management,* (91-119. Ann Arbor, MI: Health Administration Press.

Health Research Institute. (1983). *Health Care Cost Containment: Third Biennial Survey.* Walnut Creek, CA.

Health Research Institute. (1986). *Health Care Cost Containment: Fourth Biennial Survey.* Walnut Creek, CA.

Helbing, C. (1983). *Medicare: Use and Reimbursement for Aged Persons by Survival Status, 1979.* Washington, D.C.: Health Care Financing Administration.

Hembree, W. E. (1985). "Getting Involved: Employers as Case Managers." *Business and Health* 2(8), 11-14.

Henderson, M. G., and Wallack, S. S. (1987). "Evaluating Case Management for Catastrophic Illness." *Business and Health* 4(3), 7-11.

Herzlinger, R. E. (1985). "How Companies Tackle Health Care Costs: Part II." *Harvard Business Review* 63, 108-120.

Herzlinger, R. E., and Schwartz, J. (1985). "How Companies Tackle Health Care Costs: Part I." *Harvard Business Review* 63, 69-81.

Interstudy. (1985). *National HMO Census, 1984.* Excelsior, MN.

Interstudy. (1986). *National HMO Census, 1985.* Excelsior, MN.

Jackson-Beeck, M., and Kleinman, J. H. (1983). "Evidence for Self-Selection Among Health Maintenance Organization Enrollees." *Journal of the American Medical Association* 250, 2826-2829.

Jarrell, M. A., Ashmead, G. G., and Mann, L. I. (1985). "Vaginal Delivery After Cesarean Section: A Five Year Study." *Obstetrics and Gynecology* 65, 628-632.

Kasper, J. A., Anderson, R., and Brown, C. (1975). "The Financial Impact of Catastrophic Illness as Measured in the CHAS-NORC National Survey." (Contract No. HRA, 106-74-24). Prepared for the National Center for Health Services

Research. Chicago, IL: Center for Health Administration Studies.
Kaufman, S. L., and Shepard, D. S. (1982). "Costs of Neonatal Intensive Care by Day of Stay." *Inquiry* 19, 167-178.
Knaus, W. A., Wagner, D. P., Draper, E. A., Lawrence, D. E., and Zimmerman, J. E. (1981). "The Range of Intensive Care Services Today." *Journal of the American Medical Association* 246, 2711-2716.
Kobrinski, E. J., and Matteson, A. L. (1981). "Characteristics of High Cost Treatment in Acute Care Facilities." *Inquiry* 18, 179-184.
Lavin, J. P., Stephens, R. J., Miodovnik, M., and Barden, T. P. (1982). "Vaginal Delivery in Patients With a Prior Cesarean Section." *Obstetrics and Gynecology* 59, 135-148.
Lipschultz, C., Scanlon, J., and Brunner, D. (1984). "Contracting With Preferred Hospitals: A Guide for Purchasers." *Health Cost Management* 1(6), 3-6, 14.
Longest, B. B. (1985). "Pittsburgh Embraces HMO Development." *Business and Health* 3(2), 11-15.
Louis Harris and Associates, Inc. (1980). Employers and HMOs: A Nationwide Survey of Corporate Employers in Areas Served by Health Maintenance Organizations. Prepared for the Henry J. Kaiser Family Foundation. New York, NY.
Louis Harris and Associates, Inc. (1985a). Equitable Healthcare Survey III: Corporate Initiatives and Employee Attitudes on Cost Containment. Conducted for the Equitable Life Assurance Society of the United States. New York, NY.
Louis Harris and Associates, Inc. (1985b). A Report Card on HMOs, 1980-1984. Prepared for the Henry J. Kaiser Family Foundation. New York, NY.
Lubitz, J., and Prihoda, R. (1984, Spring). "The Use and Costs of Medicare Services in the Last Two Years of Life." *Health Care Financing Review* 5, 117-131.
Luft, H. S. (1981). *Health Maintenance Organizations.* New York: John Wiley and Sons.
Mazoway, J. M. (1987). "Early Intervention in High Cost Care." *Business and Health* 4(3), 12-13, 16.
McCall, N. (1984). "Utilization and Costs of Medicare Services by Beneficiaries in Their Last Year of Life." *Medical Care*, 22, 329-342.
McCall, N., and Wai, H. S. (1981). *An Analysis of the Use of Medicare Services by the Continuously Enrolled Aged.* (Grant #95-P-97150/9-04). Menlo Park, CA: Stanford Research Institute International.
Merrill, J. (1985). "Defining Case Management." *Business and Health* 2(8), 5-9.
Newhouse, J. P., Manning, W. G., Morris, C. N., Orr, L. L., Duan, A., Keeler, E. B., Leibowitz, A., Marquis, K. H., Marquis, M. S., Phelps, C. E., and Brook, R. H. (1981). "Some Interim Results From a Controlled Trial of Cost Sharing in Health Insurance." *New England Journal of Medicine* 305, 1501-1507.
Notzon, F. C., Placek, P. J., and Taffel, S. M. (1987). "Comparisons of National Cesarean Section Rates." *New England Journal of Medicine* 316, 386-389.
O'Donnell, P. S. (1985). "A Communication Program to Fit Employee Needs." *Business and Health* 2(10), 10-12.
Phelps, C. E., and Newhouse, J. P. (1973). *Coinsurance and the Demand for Medical Services* (R-964-OEO/NC). Santa Monica, CA: Rand.
Polakoff, P. L. (1982). "Pathology vs. Prevention: The Health Promotion Debate." *Occupational Health and Safety* 51(6), 13-15.
Pomerance, J. J., Ukrainski, C. T., Ukra, T., Henderson, D. H., Nash, A. H., and Meredith, J. L. (1978). "Cost of Living for Infants Weighing 1,000 Grams or Less at Birth." *Pediatrics* 61, 908-910.
Rosenbaum, S. (1987). "Prenatal Neglect Increases Maternity, Child Health Costs." *Business and Health* 4(3), 22-23.
Rosenbloom, D. L., and Gertman, P. M. (1984). "An Intervention Strategy for Controlling Costly Care." *Business and Health* 1(8), 17-21.
Sapolsky, H. M., Altman, D., Greene, R., and Moore, J. D. (1981). "Corporate Attitudes Toward Health Care Costs." *Milbank Memorial Fund Quarterly/Health and Society* 59, 561-585.
Schroeder, S. A., Showstack, J. A., and Roberts, H. E. (1979). "Frequency and Clinical Description of High Cost Patients in 17 Acute Care Hospitals." *New England Journal of Medicine* 300, 1306-1309.
Segal, E. A. (1984). "New Delivery Arrangement Prompts Quest for Data." *Business and Health* 1(3), 15-17.
Shiver, J. (1986, August 27). "Health Care Costs Rising Faster, Study Shows." *Los Angeles Times*, Part IV, 2, 4.
Silver, R. K., and Gibbs, R. S. (1987). "Predictors of Vaginal Delivery in Patients With a Previous Cesarean Section, Who Require Oxytocin." *American Journal of Obstetrics and Gynecology* 156, 57-60.
Spencer and Associates. (1983). "Treating a Few Cases Individually Saves a Bundle." *Employee Benefits Plan Review* 38(5), 50-51.
Spencer and Associates. (1985, February). "Group Insurance Survey by TPF&C Analyzes Medical, Dental Plans." *EBPR Research Reports.*
Spitz, B. (1985). "Medicaid Case Management: Lessons for Business." *Business and Health* 2(8), 16-20.
Stokehold, K. (1979). Deere and Company. In R. H. Egdahl and D. C. Walsh (Eds.), *Containing Health Benefits Costs: The Self-Insurance Option.* New York: Springer-Verlag.
Stone, M. H. (1986). "Transforming Employees into Prudent Purchasers." *Business and Health* 3(9), 36-38, 40.
Taravella, S. (1986, February 17). "Employers Banding Together to Analyze Health Claims Data." *Business Insurance.*
Thibault, G. E., Mulley, A. G., Barnett, G. O., Goldstein, R. L., Reder, V. A., Sherman, E. L., and Skinner, E. R. (1980). "Medical Intensive Care: Indications, Interventions and Outcomes." *New England Journal of Medicine* 302, 938-942.
Trapnell, G. R., and McFadden, F. E. (1977). "The Rising Cost of Catastrophic Illness." Prepared for the National Center for Health Services Research (Contract No. HRA 230-75-0143). Falls Church, VA: Actuarial Research Corporation.
U.S. Corporate Health Management. (1985) "Analysis of Claims Experience and Recommendations for the BankAmerica Medical Plan." Santa Monica, CA.
Waldo, D. R., Levit, K. R., and Lazenby, H. (1986, Fall). "National Health Expenditures, 1985." *Health Care Financing Review* 8, 1-21.
Walsh, D. C. (1980). "The Health Insurance Industry: Structural and Strategic Issues in an Uncertain Environment." *Health Care Management Review* 5, 71-85.
Webber, A., and Goldbeck, W. B. (1984). "Utilization Review." In P. D. Fox, W. B. Goldbeck, and J. J. Spies (Eds.), *Health Care Cost Management.* Ann Arbor, MI: Health Administration Press.
Whitted, G. S. (1984). *The Allocation and Management of*

Direct Health Care Expenses for Employees and Their Dependents: Three Case Studies at Fortune 500 Corporations. (Report 84-3). Brookfield, WI: International Foundation of Employee Benefit Plans.

Whitted, G. S., and Torrens, P. R. (1985). *Managing Corporate Health Care Expenses: A Primer for Executives.* New York, NY: Praeger.

Zook, C. J., and Moore, F. D. (1980). "High Cost Users of Medical Care." *New England Journal of Medicine* 302, 996-1002.

Appendix

DATA AND METHODS

An analysis of medical claims combined with personnel records from a very large corporation was undertaken to address the research questions. This appendix describes the data upon which the investigation was based and presents the research methods.

The appendix is organized into five sections. The first section provides a brief profile of the employed population from which the study group was selected, followed by a summary of the important features of the company's medical plan. Described in the second section are the two sources of data used in the dissertation—personnel records from the company and medical claims records from its carrier. Variables that were available for analysis from each set of data are identified here.

Steps that were followed in preparing the data for analysis, e.g., cleaning, editing, sorting, etc., are detailed in the third section of the appendix. Decision rules and assumptions that were made in preparing the data for analysis are presented in this section, along with their rationale. The fourth section reviews the strengths and weaknesses of the data with respect to the research objectives.

Methods that guided the research are described in the final section of the appendix. "High cost expenditures"—the dependent variable—is defined, along with each of the independent variables whose associations with high cost medical care were investigated. The appendix concludes by specifying the analyses that were conducted to address the research questions.

The Company and Its Medical Plan

Data for this study of high cost patients in an employer-sponsored fee-for-service medical plan were provided by one of the nation's largest financial institutions and its claims administrator. During the years under investigation, the vast majority (over 90%) of this company's 80,000 employees resided in California; the remainder lived in either a different state or another country.

The age and gender composition of employees of this company is similar to that of other large financial institutions (U.S. Department of Commerce, 1980). The majority of employees (about three-fourths each year) are female, and their average age is fairly young (36 years in 1986). Employees are distributed throughout every county in California, with large concentrations in the San Francisco Bay Area and Los Angeles County.

Upon hire and at the end of each calendar year, benefits-eligible employees select a health care plan. They may either join the company's self-insured fee-for-service medical plan or enroll in one of the health maintenance organizations (HMOs) offered by their employer. Irrespective of which option they choose, employees are required to contribute to the cost of their coverage. To avoid making this contribution, about 20% of the employees each year opt for no coverage. About 55% of the remaining employees join the company's self-insured fee-for-service medical plan, herein referred to as "The Plan."

Until the beginning of 1984, The Plan provided basic benefits for inpatient hospital care and surgery, with *supplemental* major medical benefits for all other services. Under first dollar coverage provisions, i.e., no deductible, inpatient hospital services and supplies were covered at 100% and surgery was covered at 80%. An important exception to the provision of 100% coverage for inpatient hospital services was psychiatric care. At the beginning of 1982, inpatient psychiatric care was restricted to $10,000 per year; prior to that time, however, there were no limitations on inpatient psychiatric services.

With the exception of psychiatric care, outpatient services were covered at 80% after the major medical deductible ($100 per individual; $250 per family) had been met. Outpatient psychiatric care was covered at 50%, up to a calendar year maximum of $1,000. Physical therapy services, Christian Science care and chiropractic services were covered at 80%, up to a combined annual maximum of $750. Pregnancy-related expenses were covered, but preventive services were not. Out-of-pocket expenses were limited to $1,000

annually, excluding the deductible and any amounts exceeding the benefit maximums described above. The lifetime maximum benefit paid by The Plan was $300,000 for major medical expenses.

In 1984, The Plan was transformed to provide *comprehensive* major medical benefits. This meant that the deductible, which was raised to $150 per individual ($375 per family), applied to all covered services. Once the deductible was met, The Plan paid 80% of usual, customary and reasonable charges for medically necessary services. Coverage was added for preventive services, including well baby care, routine childhood immunizations and Pap smears. The $1,000 annual limit on out-of-pocket expenditures was not changed, but the lifetime maximum benefit was increased to $500,000. Finally, to encourage more appropriate utilization of surgery benefits, a mandatory second surgical opinion program and outpatient surgery incentives were added to The Plan.

With the exception of a three day inpatient detoxification benefit, chemical dependency—alcoholism and drug abuse—was *not* covered by The Plan during the years under investigation. The company has maintained a special benefit program for chemical dependency problems designed to refer patients to appropriate sources of treatment in the community. During the years studied, this program was not often used because its administration was very informal and most employees were unaware of its existence. When the program was used, provider claims were processed internally by the company, rather than by its carrier. Data concerning chemical dependency problems experienced by the study population were therefore unavailable for analysis.

Data Sources and Elements

Personnel Data

The company supplied five consecutive years of computerized personnel records, spanning 1980 through 1984. Each year of personnel data presented a snapshot of the company's workforce as of December 31. Included in the personnel database were records for all current employees—active and on leaves of absence and former employees—until 18 months after termination of employment and retirees—until 18 months after death. For each employee, the personnel database provided his or her Social Security number; date of employment; date of birth; gender; zip code of residence; medical plan; most recent *prior* medical plan (only if a change in plans had ever been made) and the date coverage in that plan ended; and a transaction code reflecting the status of the employee (e.g., new hire, rehire, leave of absence, voluntary termination, etc.), along with the date upon which the transaction took effect.

The medical plan variable contained on each year of data identified the plan the employee had selected during open enrollment for the *next year*. Since many employees changed plans or eliminated coverage altogether during open enrollment, the medical plan code did not necessarily reflect the plan in which the employee had been a member throughout the year. To correct this disparity, the medical plan code for each employee was transferred to his or her data for the following year, e.g., the 1980 code became the 1981 code, the 1981 code became the 1982 code, and so on. Employees newly hired, and therefore lacking a medical plan code from the prior year, were assumed to have the same medical plan that they chose for the next year, unless a different prior medical plan was indicated. When a different prior medical plan was indicated, with an appropriate end date, it was assumed to have been the plan for the current year.

Without 1979 personnel records, it was impossible to determine the current medical plan of employees in the 1980 database. Therefore, the 1980 data were excluded from analysis.

Claims Data

At the company's request, computerized tapes of claims records from its fee-for-service medical plan were furnished by its claims administrator. The claims files originally contained 100% of *claims paid* between January 1, 1981 through December 31, 1985. These files were subsequently transformed into *claims incurred* (i.e., dates of service) from January 1, 1981 through December 31, 1984, so that they would be consistent with the personnel records. Any claims that were incurred between the beginning of 1981 and the end of 1984, but not paid as of the end of 1985, were not in these data. Based on several years of historical

experience with The Plan, however, the percentage of claims falling into this group was expected to be extremely small—probably less than 1%.

The claims data reflected the medical care expenses and utilization of each employee, spouse and child covered by The Plan at any time from January 1, 1981 through December 31, 1984. Included in the record of each claim filed on behalf of these individuals was the employee's Social Security number; relationship of the claimant to the employee (i.e., employee, spouse or child); claimant's date of birth and gender; date of service; date of payment; provider of service; type of provider; place of service; number of units of service (e.g., hospital days, outpatient visits, prescription drugs, etc.); an ICD diagnostic code; a CPT-4 or RVS procedure code; the billed charge; the allowed charge; and the paid amount.

Preparation of the Database

The database for the research was comprised of all claims incurred by plan members from January 1, 1981 through December 31, 1984. Claims records were linked with employee personnel records for the same four years on the basis of employee Social Security number—a variable common to both data sets. In addition to providing sociodemographic and job-related information, the personnel records provided variables that were used to derive employee eligibility for the study. Spouses and children were assumed to have the same eligibility as their related employee because dependent-specific eligibility data for The Plan were unavailable.

Numerous cleaning and editing tasks were performed on both the personnel data and the claims data before they were merged. The steps that were followed in preparing the combined database are described below.

Personnel Data

Initial steps in preparing the personnel data for analysis were to frequency the values of all categorical variables and to manually review 200 observations (i.e., employee records) for each of the four years of data. These steps were undertaken to: (a) assure the data were complete and generally consistent from year to year in their format and content; (b) assess the reasonableness of data values; and (c) check for missing data values.

No significant problems or research obstacles were identified by these initial checks of the data. The number of missing values and extreme data values associated with each variable was quite small in relation to the size of the database—generally much less than 1%. In addition, manual review of the data suggested that some, if not all, of these problematic data values would be eliminated upon narrowing the personnel records to the population of interest. This suspicion was borne out by frequency distributions from the final data set.

Ascertaining employees' eligibility for the study population for each year that they appeared in the personnel records was the next major task. The population of interest to the research was nonelderly active employees and their dependents belonging to an employer-sponsored fee-for-service medical plan. Based on a programming algorithm that incorporated employee age, date of employment, medical plan, job status and zip code of residence, employees were categorized each year as: (a) *exclude*, i.e., not eligible for the entire year; (b) *keep*, i.e., eligible for the entire year; (c) *accretion*, i.e., gained eligibility midyear; (d) *attrition*, i.e., lost eligibility midyear; or (e) *both* attrition and accretion, i.e., gained and lost eligibility within the year.

Employees, and therefore their dependents, were excluded from analysis during a particular year for any one of the following reasons: retirement or termination of employment prior to January 1; over 65 years of age; not covered by The Plan; residence outside of California; or employment too recent to have fulfilled the 90 day waiting period for medical benefits. Conversely, to be considered part of the study population for a given year, an individual had to be actively employed, under age 65, a member of The Plan and residing in California.

Active employees over age 65 were excluded from analysis because Medicare was the primary payer for these individuals until 1983, when the Tax Equity and Fiscal Responsibility Act (TEFRA) made employer-sponsored medical plans the primary payer for active employees 65 through 69 years. Employees residing outside of California were excluded to avoid the influence of large geographic differentials in medical costs on the incidence of high cost patients within the study group.

Table A-1

YEARS OF DATA FOR ELIGIBLE EMPLOYEES

Number of Complete Consecutive Years	Number of Employees	Percent of Eligible Employees (n=43,366)
Less than 1	7,605	17.5%
At least 1	35,761	82.5
At least 2	27,009	62.3
At least 3	20,281	46.8
4	13,454	31.0

Employees assigned to the accretion category met all of the study criteria, with the exception of having joined The Plan in the middle of the year rather than belonging for the entire year. Employees in this group were new hires, rehires, reinstatements or had just returned from a military leave of absence. Similarly, employees categorized in the attrition group initially met all of the study criteria, but subsequently retired, turned 65 or left The Plan in the middle of the year. The most common reason for leaving The Plan was termination of employment; another potential reason was the initiation of a military leave of absence.

Employees on military leaves of absence never continued their coverage in The Plan while they were on leave. Employees on extended personal or medical leaves of absence could retain their coverage in The Plan by paying the entire premium. It was assumed that all employees on medical or personal leaves retained coverage, because available data did not permit a determination of which employees on leave kept their coverage and which did not. This decision was made after discussions with the benefits administration staff of the company, who indicated that in the majority of personal and medical leaves the employee did continue coverage.

The third aspect of refining the personnel data for analysis was to link horizontally all four years of personnel records on the basis of employee Social Security number. This created a longitudinal picture of the employment and medical plan enrollment histories for each employee in the data. Initially, there were 98,202 unique employee Social Security numbers in the combined personnel database. Of those, 54,836 (56%) were excluded for all four years of data, usually because they had retired or terminated employment before 1981, or they had never belonged to The Plan. The remaining 43,366 employees were eligible for the study population for some period of time, although often (18%) for less than one full calendar year. Table A-1 indicates the number of complete consecutive years in which these 43,366 individuals were eligible for the study population.

Several additional checks of the personnel records were undertaken before linking them with the claims data. Frequency distributions were repeated on all categorical variables of interest to the study to determine whether aberrant data and missing values presented a problem among employees eligible for the study group. The number of missing values for any given variable in any year was trivial (e.g., ten cases out of 25,000 observations). Data values exceeding reasonable limits were not observed among the population of interest to the research.

Variables whose values should not have changed over time for an individual employee—date of birth and gender—were examined across years. Variations were observed, but only in a very small number of cases—fewer than 20 employees per year. To avoid eliminating these employees from the study population, a decision was made to use the values for age and gender presented in the most recent year of data. Besides being consistent with what was observed in the data for these cases, this decision rule reflected the belief that most of these year-to-year variations in age and gender resulted from initial data processing errors that were subsequently corrected upon identification by the employee.

Claims Data

Five calendar years (1981-1985) of paid claims data were provided originally, each containing between 750,000 and one million medical and dental claims records. Although these data were subsequently reorganized into claims incurred from January 1, 1981 through December 31, 1984, preliminary data checks were conducted on the paid claims. As with the personnel records, for each year of data all categorical variables were frequencied and 200 observations (i.e., claim records) were manually reviewed. Before generating the frequency distributions, all dental claims (about one-third of total records) were eliminated from the data because they were not pertinent to the research.

Year-to-year consistency was extremely high in the distributions of such variables as type of service, place of service, type of provider and units of service. This stability in claims experience was probably due to high enrollment in The Plan (between 60,000 and 70,000 covered lives each year), and the fact that relatively few changes in benefits coverage or plan administration were made during the years under investigation.

Very few missing values were observed in the data, i.e., no more than 400 records per variable out of 560,000 observations. Extreme or nonsensical values were also rare. With respect to diagnostic coding, however, more than one-third of the claims records were coded with "general symptoms" or "unspecified signs and symptoms." This percentage of unspecific diagnostic coding is common in claims data. Fortunately, *large dollar* claims such as hospital bills were required by the carrier to have much more precise diagnostic coding. Therefore, the research objective of identifying the most frequent health problems of the *high cost* patients was not believed to have been hindered by insufficient coding.

An important aspect of the initial data checks was to calculate the average time lag between date of service and date of payment. A review of the five years of paid claims data indicated that over 99% of claim records incurred in any calendar year were paid before the end of the subsequent calendar year. As a result, when the claims paid from 1981 to 1985 were reorganized into claims incurred from 1981 through 1984, it was believed that less than 1% of claims incurred in 1984 were unavailable for analysis. Logically, one would assume that these claim records represented very low cost services, because the financial incentive for both claimants and providers to seek prompt reimbursement increases with the dollar value of the claim.

Once the data were transposed into incurred claims for each year, the next step was to sort the data by employee Social Security number so that all claims for a family were together. Since individual claimants rather than families were the desired unit of analysis, these data were further sorted within employee Social Security number on the basis of dependent relationship code and date of birth. The dependent relationship code identified the claimant as either an employee, a spouse or a child. This code, however, did not identify unique individuals when there were multiple spousal or children claimants associated with one employee Social Security number; hence, the use of birth date as an additional identifier.

Upon manual review of 5,000 potentially unique claimants identified by the algorithm incorporating employee Social Security number, dependent relationship code and claimant date of birth, it became clear that there were many coding errors in the latter two variables. To minimize inaccuracies in identifying unique claimants, several decision rules were developed based on that review of data. First, within a given Social Security number, all claims with a dependent relationship code indicating "employee" were considered to be the employee's claims. This meant that if there were two or more claims with an employee dependent relationship code but different dates of birth, all claims were treated as those of the employee. This decision was made because it was not possible to distinguish true employee claims that happened to have a miscoded date of birth from claims inaccurately coded as "employee." As a result of this rule, within a given family some dependent claims may have been considered to be the employee's claims

The next decision rule concerned spouses. Out of the 5,000 "unique" claimants identified by the original algorithm, 152 cases of multiple spouses for a single employee were observed. Manual review of the data revealed that only three of these cases were truly second spouses. The other 149 cases represented miscoded dependent relationships or dates of birth. Since it was impossible to accurately correct the miscodes, a decision was made that all claims with a dependent relationship code of "spouse" would be

attributed to a single spouse. As a result, one employee could not have more than one spouse covered by The Plan in a given year.

The final decision rule pertained to children. In reviewing the 5,000 observations of data, it was apparent that miscoded dates of birth were causing the identification of a larger number of children claimants than actually existed. Most of these errors were correctable by assuming that all claims with a date of birth within 12 months from the earliest date of birth pertained to the same child. The unavoidable problem with this approach was that twins were considered to be a single individual, as were children born within one year of each other.

The decision rules described above were applied to the claims data to assign each individual claimant a unique identifier. Then the data were sorted one final time—by date of service—so that all claims for each claimant were organized chronologically.

Once the claims records were arranged in a manner appropriate for the planned analyses, the next step was to eliminate exact duplicates and credit adjustments from the claims records. Records which were exact duplicates of other records appeared to be system-generated at random by the carrier in its production of the data tapes. In other words, there was no logical reason for these records to have appeared in the data. Upon conference with the carrier, it was determined that one of each set of exact duplicate claim records should be eliminated from analysis. Credit adjustments, however, represented deliberate multiple processing of the same claim; these records were used to adjust for errors in the original processing of the claim. Upon instruction from the carrier as to how to handle these records, both lines of data were eliminated for credit adjustments. Although the number of exact duplicates and credit adjustments throughout the data was relatively small, their inclusion in the data would have artificially inflated measures of both utilization and expenditures.

The last major task in preparing the claims data was to create inpatient "episodes of care" within the data for each claimant. Inpatient episodes, i.e., individual hospitalizations and all related services, were identified based on room and board charges and their associated dates of service. All services that were provided on days bracketed by room and board charges were considered to be part of the same inpatient episode, with one exception. On the date of discharge, to be included with the inpatient episode, services had to be coded with a place of service denoting an inpatient setting. Any services that were coded as being provided at home, in the outpatient department of the hospital or in a practitioner's office on the discharge date were not considered part of the hospitalization.

Hospitals commonly submit one or more interim bills for payment in the middle of a lengthy hospitalization. To avoid counting each interim bill as a separate hospitalization, it was assumed that any hospital bill with an admission date one day after the discharge date from another hospital bill belonged to the first hospitalization. When a hospitalization began in one calendar year and ended in the next calendar year, a decision was made to count the entire inpatient episode (i.e., all of the patient days and all of the charges) in the year in which the hospital stay was initiated.

The Merge

Claims records were linked with personnel records on the basis of employee Social Security number. The only variable from the personnel data that was linked with claims for spouses and children was the one which identified eligibility for the study population. As discussed earlier, it was necessary to assume that the dependent's eligibility was equivalent to the employee's eligibility, since dependent eligibility data for The Plan were lacking. Claims for individuals not eligible for the study group were eliminated from analysis.

Strengths and Limitations of the Data

Several factors encouraged the use of the personnel and claims data described above for a study of high cost patients among members of an employer-sponsored fee-for-service medical plan. First, the company supplying the data had an extremely large workforce—over 80,000 employees. Membership in this company's medical plan (an estimated 60,000 to 70,000 covered lives each year) was sufficient to assure a sizable

population of high cost patients for investigation. Inadequate sample size has raised questions of reliability in some earlier studies of high cost patients (Alexandre, 1987).

Another advantage of these data was that they permitted following *individual* plan members—employees, spouses and children—over a period of several consecutive years. The only prior substantive research on high cost patients in an employer-sponsored fee-for-service medical plan (Congressional Budget Office, 1982) was restricted to an analysis of high cost *families*, because it was not possible to separate the claims of spouses and children from those of the employees.

A third advantage of these data was that, with the exception of chemical dependency, coverage under The Plan was fairly broad and comparable to that provided by many other employers. Finally, with the exception of coverage for inpatient psychiatric care, relatively few changes in benefits were made during the time period under consideration, resulting in a very stable claims experience from year to year.

As with any analysis of data collected for purposes other than the research objectives, there were some inherent limitations in the data with respect to the research objectives. First, it was unlikely that the claims data reflected 100% of the medical expenditures and utilization for each plan member. Some individuals whose medical expenditures did not exceed the annual deductible ($100 in 1981-1983; $150 in 1984) probably did not submit their bills to The Plan. However, since the goal of the research was to analyze *high cost* patients, the absence of data on those expenses that were too small to be claimed was not considered a significant limitation.

An unknown percentage of the spouses and children covered by The Plan were also covered by another medical plan. When the other plan was primary (i.e., the first payer), some of the claims for these individuals may not have been submitted to The Plan for reimbursement. However, in most cases of double coverage, the claims were probably submitted to both carriers in an attempt by the claimant to maximize reimbursement. When The Plan received a claim for which it was the second payer, it still processed the claim and calculated the allowed charge as if it were the first payer. Then, instead of paying the amount it would have as the first payer, The Plan coordinated benefits with the other carrier and subsequently paid a smaller portion (or nothing) of the claim. Since *allowed charges*, rather than *dollars paid*, were the basis for all expenses considered in this study, the impact of The Plan being a second payer for many dependents was believed to be minimal.

Another constraint of these data was the unavailability of information on dependent eligibility. Similar to a surprisingly large number of other major employers, the company did not know the total number of members in its self-insured medical plan. Consequently, all dependents were assumed to have the same eligibility as the related employee. This assumption was obviously inaccurate in cases where new dependents were added in the middle of the year (e.g., the employee married or had a child) or deleted from coverage (e.g., the employee divorced or had a child that reached an age of no longer being eligible for The Plan). Dependents who joined or left The Plan in the middle of the year clearly had less opportunity to incur high cost expenses than dependents who were members of The Plan for the entire year.

Due to the lack of information on the number of dependents covered by The Plan, dependent utilization rates could only be calculated for *claimants*. Nothing could be inferred about children and spouses covered by The Plan who did not submit claims.

Finally, although the research objective was to analyze high cost patients in a *fee-for-service* medical plan, the fact that 45% of the company's employees belonged to a health maintenance organization (HMO) cannot be ignored. There was no way of knowing how many high cost (or potentially high cost) patients were members of an HMO rather than The Plan. Purely financial arguments would suggest that these individuals were more likely to be found in an HMO because of the substantially reduced out-of-pocket costs associated with this form of coverage. However, considerable research on the topic of HMO selection has found that many other variables besides cost influence the decision of whether or not to join an HMO. Among these other variables are issues of perceived access and quality, convenience of providers, benefits available and the strength of ties to an existing delivery system (Berki & Ashcraft, 1980; Luft, 1981).

An analysis of systematic differences between employee members of The Plan and employee members of the HMOs offered by the company recently was completed. This study found that the average age of

employees that consistently belonged to The Plan from 1981 through 1983 was 7.6 years greater than the average age of employees who consistently belonged to an HMO during the same time period. Employees who switched from no coverage to membership in The Plan were slightly more than three years older, on average, than employees who switched from no coverage to HMO enrollment. Given the strong positive relationship identified in The Plan between age and high cost medical expenses, these data suggest that a larger proportion of high cost patients may have been found in The Plan rather than in the HMOs.

Research Methods

Definition of the Dependent Variable

The dependent variable for this study—annual medical expenditures—was operationalized as annual adjusted allowable charges for individual claimants. Allowable charges included all expenses that were covered by The Plan, whether they were paid by the employee, The Plan or another carrier. To adjust for inflation in the health care sector from 1981 through 1984, allowable charges from 1981, 1982 and 1983 were inflated to 1984 values using the medical care component of the Consumer Price Index (CPI). Besides eliminating the influence of medical care inflation on the annual incidence of high cost patients in The Plan, the use of constant dollars enabled different calendar years of data to be combined for some of the longitudinal analyses.

When a claimant's adjusted allowable medical charges for the year equaled or exceeded $5,000, he or she was considered a "high cost" patient. Individuals whose annual allowable charges were $25,000 or higher were categorized as "very high cost" patients. "Low cost" patients were those whose annual allowable charges were less than $5,000.

Five thousand dollars was selected as the high cost threshold for three reasons. First, this level resulted in a group of high cost patients sufficiently large for reliable analysis. Second, it permitted the research findings to be compared with earlier investigations of high cost patients that used similar definitions. Finally, $5,000 is The Plan's individual stop-loss point, i.e., its catastrophic limit. After $5,000 in allowable charges are incurred by a member in a single year, The Plan pays 100% of additional allowable charges incurred during that year, up to the lifetime maximum benefit of $500,000.

With prices for medical care being as high as they have been, an individual with an annual medical expense of $5,000 in 1984 constant dollars was not necessarily someone who had a serious health problem. In many instances, a single inpatient episode for a "routine" operation or a relatively nonserious health condition could have resulted in a hospital bill of more than $5,000. For example, a prior analysis of the company's claims data found that the mean allowable inpatient charge for a Cesarean section delivery in 1983 and 1984 exceeded $5,000 (U.S. Corporate Health Management, 1985). Therefore, a threshold of $25,000 was added to the analysis to distinguish the more seriously ill patients from those who may simply have experienced a single hospital admission for less critical reasons.

Definition of the Independent Variables

Twelve sociodemographic, expense and utilization variables from the claims data were selected for analysis in this study. These variables were: age; gender; dependent relationship; admissions; patient days; psychiatric admissions; psychiatric patient days; outpatient visits; outpatient physician visits; outpatient mental health visits; prescription drugs; and major diagnostic categories.

Each of the independent variables is defined below.

Age: Claimant's age (in years) as of December 31 of the year services were incurred. This was calculated from the date of birth on each claim record. To avoid the problems associated with conflicting or missing dates of birth, the age for *employee* claimants was always taken from their personnel data for the same year. When different dates of birth were present in the claims records for a dependent, the modal (i.e., most frequent) date of birth was used to calculate age. Dependent claimants who were missing their date of birth entirely (fewer than ten claimants each year) were excluded from those analyses which relied on age as a variable. These dependents were included in all other analyses.

Gender: Male or female. When some claims records for the same claimant indicated "male" and others indicated "female," the modal gender was assumed to be the true gender.

Dependent relationship: Employee, spouse or child. "Child" refers to a relationship between the employee and the claimant; it does *not* refer to the age of the claimant. "Children" can be covered by The Plan until age 30 if they are full-time students. Some "children" covered by The Plan are much older, e.g., those that are either mentally retarded or totally and permanently disabled and still a legal dependent of the employee.

Admissions: Number of admissions to any type of inpatient facility. To be counted as an admission, the patient had to spend at least one night in the facility. Same day admission and discharge was *not* considered an admission.

Patient days: Number of nights spent in any type of inpatient facility.

Psychiatric admissions: Number of admissions associated with a psychiatric diagnosis, i.e., ICD codes 320.00-389.99.

Psychiatric patient days: Number of patient days associated with a psychiatric diagnosis.

Outpatient visits: Number of outpatient visits with physicians, chiropractors, podiatrists, physical therapists and various mental health practitioners, whether the visit took place in the practitioner's office, a clinic, the patient's home or the outpatient department of a hospital.

Outpatient physician visits: Number of outpatient visits with physicians, i.e., medical doctors and doctors of osteopathy.

Outpatient mental health visits: Number of outpatient physician, hospital or clinic visits associated with a psychiatric diagnosis *plus* all outpatient visits with mental health practitioners, i.e., psychologists; marriage, family and child counselors; and licensed clinical social workers, irrespective of diagnosis.

Prescription drugs: Number of outpatient prescription medications, including the initial fillings and all refills.

Major diagnostic categories: Three digit International Classification of Diseases codes that have been grouped into 16 categories of "related" conditions, e.g., neoplasms, diseases of the respiratory system, congenital anomalies, etc. For inpatient episodes, the MDC that was coded on the earliest room and board claim associated with the admission was assumed to be the MDC for the entire stay.

The Study Population

Four calendar years of data were analyzed in this research—1981 through 1984. As described in Section VIII, employee eligibility for the study was determined based on information from the personnel database. Dependents were assumed to have the same eligibility as their related employees.

To be included in the study group for a particular year, an employee had to be full or prime time (i.e., benefits-eligible), under age 65, residing in California and a member of The Plan for the entire 12 months. Also comprising the study population were the dependents of these employees, i.e., their covered spouses and children, so long as they were under age 65.

During each of the four years, employees who turned 65 or who had less than a complete year of membership in The Plan (i.e., the accretion and attrition groups) were excluded from analysis along with their dependents. Individuals with partial data were omitted to avoid complicating the analyses. In particular, relating partial years of claims data to a definition of *high cost* based on *annual* charges would have required the annualization of these data. Annualization in turn would have required an assumption that the charges incurred during the months of the year for which data were available could be reasonably extrapolated to project charges for the entire 12 month period. This assumption lacks validity, since many causes of illness and their resulting utilization are known to be seasonal (Falk, Rorem & Ring, 1933; McCall & Wai, 1981) and therefore *not* evenly distributed throughout the year.

To evaluate whether a bias would be introduced as a result of excluding claimants with partial years of data, these individuals were compared to claimants with complete data on the basis of age, gender, dependent relationship and their distribution by level of medical spending during the year. Comparisons were made on three of the four years of data, 1981-1983. (The 1984 data were excluded from these analyses because the

Table A-2

NUMBER AND PERCENT OF CLAIMANTS WITH PARTIAL VS. COMPLETE DATA 1981-1983

	1981		1982		1983	
	Number	Percent	Number	Percent	Number	Percent
Claimants with partial data	4,725	14.3	3,611	9.9	3,552	9.6
Claimants with complete data	28,231	85.7	32,773	90.1	33,324	90.4
All claimants	32,956	100.0	36,384	100.0	36,876	100.0

Table A-3

MEAN AGE AND GENDER COMPOSITION OF CLAIMANTS WITH PARTIAL VS. COMPLETE DATA 1981-1983

	1981		1982		1983	
	Mean Age	Percent Female	Mean Age	Percent Female	Mean Age	Percent Female
Claimants with partial data	28.9	66.0	29.5	63.9	30.8	64.0
Claimants with complete data	32.6	62.0	31.8	61.5	31.7	61.3
All claimants	32.1	62.6	31.6	61.7	31.7	61.6

Table A-4

DEPENDENT RELATIONSHIP COMPOSITION OF CLAIMANTS WITH PARTIAL VS. COMPLETE DATA 1981-1983

	1981			1982			1983		
	Employees (%)	Spouses (%)	Children (%)	Employees (%)	Spouses (%)	Children (%)	Employees (%)	Spouses (%)	Children (%)
Claimants with partial data	63	16	21	63	16	22	60	17	22
Claimants with complete data	53	20	27	52	20	28	51	20	28
All claimants	54	20	26	53	20	27	52	20	28

personnel tape provided by the company for that year did not contain records for employees hired within the last 12 months.)

Between 10% and 14% of claimants had less than 12 complete months of data each year (Table A-2). Compared to claimants with full years of data, these individuals were younger (Table A-3), comprised of slightly more females (Table A-3) and dominated by employees (60% vs. 51% in 1983) (Table A-4). The age difference between the two groups, however, steadily diminished over the three year period—from 3.7 years in 1981 to 0.9 years in 1983. This decline can probably be attributed to severe constraints placed on hiring by the company which resulted in fewer new, and therefore younger, employees joining the workforce.

Despite these differences, claimants with partial data accounted for too small a percentage of total claimants to substantially alter the demographic or spending characteristics of the study group. This is

highlighted in Tables A-3 through A-5 by comparing claimants with full *and* partial years of data (i.e., "all claimants") to just those claimants with complete data. Appreciable differences in age, gender, dependent relationship mix and distribution by level of medical spending during the year (Table A-5) were lacking. Based on these comparisons, it was concluded that excluding claimants in years where they had partial data would not significantly alter the study's findings.

Analyses

This study was undertaken as a link between investigations that have identified the disproportionate use of health care services by a small percentage of group medical plan members and anticipated research that will attempt to develop models for predicting future utilization based on sociodemographic characteristics, health status indices and prior expenses and utilization. As such, the investigation was comprised of analyses that were descriptive in nature, rather than predictive. The objective was to identify associations between annual level of medical expenditures and sociodemographic, expense and utilization variables that could lead to further studies designed to identify causal relationships.

For each year of data, claimants were categorized as low cost (expenses below $5,000); high cost (expenses of $5,000 to $24,999.99) or very high cost (expenses of $25,000 or more). In addition to these broad expense categories, claimants were also stratified by the following (narrower) expense levels: less than $150; $150-$499.99; $500-$999.99; $1,000-$2,999.99; $3,000-$4,999.99; $5,000-$9,999.99; $10,000-$19,999.99; $20,000-$24,999.99; $25,000-$49,999.99; $50,000-$74,999.99; $75,000-$99,999.99; and $100,000-plus.

Once this stratification was accomplished, the distribution of plan expenditures within each expense category and level was cross-classified with the distribution of claimants. This was done to determine the extent to which certain groups of claimants were responsible for a disproportionate share of plan expenses. The mean expense for claimants in each expense category was also identified and compared with the average for all claimants.

In response to the research questions, three additional types of descriptive analyses were undertaken on the claimant population. First, low cost, high cost and very high cost claimants were profiled in terms of their age distribution, gender composition and dependent relationship mix (i.e., employees vs. spouses vs. children). A finite set of basic relationships between annual medical spending and age, gender and dependent relationship was investigated to determine whether high cost patients could be distinguished from low cost patients in terms of these variables, or combinations thereof. Tests of the statistical significance of these relationships were made using chi-square and ANOVA analyses. These analyses were conducted on all four years of data to ascertain the level of consistency in the identified associations.

The second set of claimant analyses examined the temporal expense and utilization experience of high cost claimants in years both subsequent and prior to their high cost year. The availability of four consecutive years of claims data made it possible to track the expenses and utilization rates of cohorts of claimants for up to three years prior or subsequent to a high cost year. Claimants were assigned to a cohort according to their expense category in their base year, i.e., the first year of data in which they appeared as a claimant. To be included in a cohort, an individual had to have been a claimant in the base year and eligible to submit claims for reimbursement (i.e., be a member of The Plan) in each of the subsequent or prior years analyzed.

As shown in Table A-6, there were 32,213 claimants who were plan members in at least one year subsequent to their base year. Of these claimants, 24,677 (77%) were plan members in at least two years subsequent to their base year; 16,794 (52%) had at least one claim in 1981 and were plan members in all three subsequent years.

To maximize the number of years over which the high cost patients could be tracked, the subsequent-year analyses were conducted on individuals who were claimants in 1981 and members of The Plan for all four years. By limiting the analyses to this particular group, however, the number of individuals that could be followed was substantially smaller than if the analyses had been confined to one or two subsequent years. In addition, this methodology excluded from analysis any employees who left the workforce due to ill health or death during this four year period.

Table A-5

DISTRIBUTION OF CLAIMANTS WITH PARTIAL VS. COMPLETE DATA BY EXPENSE LEVEL AND CATEGORY 1981-1983

Expense Level and Category	1981			1982			1983		
	Claimants With Partial Data (%)	Claimants With Complete Data (%)	All Claimants (%)	Claimants With Partial Data (%)	Claimants With Complete Data (%)	All Claimants (%)	Claimants With Partial Data (%)	Claimants With Complete Data (%)	All Claimants (%)
<$150	36.91	31.16	31.98	35.27	30.53	31.00	35.56	29.65	30.22
$150-499.99	29.46	32.84	32.36	30.59	32.39	32.21	29.73	32.02	31.80
$500-999.99	10.97	13.68	13.29	11.06	14.03	13.74	12.19	14.34	14.13
$1,000-2,999.99	13.43	12.43	12.57	12.72	13.07	13.03	11.91	13.59	13.43
$3,000-4,999.99	4.38	4.05	4.10	4.57	4.14	4.18	4.34	4.37	4.37
All low cost claimants	95.15	94.16	94.30	94.21	94.16	94.16	93.73	93.97	93.95
$5,000-9,999.99	3.47	3.82	3.77	3.44	3.75	3.72	4.08	3.96	3.98
$10,000-19,999.99	0.70	1.24	1.17	1.30	1.35	1.35	1.07	1.23	1.21
$20,000-24,999.99	0.15	0.18	0.18	0.25	0.21	0.21	0.28	0.22	0.23
All high cost claimants	4.32	5.24	5.12	4.99	5.31	5.28	5.43	5.41	5.42
$25,000-49,999.99	0.36	0.42	0.41	0.47	0.38	0.39	0.62	0.42	0.44
$50,000-74,999.99	0.06	0.11	0.10	0.22	0.10	0.12	0.16	0.10	0.11
$75,000-99,999.99	0.06	0.03	0.04	0.03	0.02	0.02	0.06	0.05	0.05
$100,000+	0.04	0.04	0.04	0.08	0.02	0.02	0.03	0.03	0.03
All very high cost claimants	0.52	0.60	0.59	0.80	0.52	0.55	0.85	0.60	0.63
All claimants*	99.99	100.00	100.01	100.00	99.99	99.99	100.01	99.98	100.00

*Percents may not total to 100.00 due to rounding error.

Table A-6

MEAN EXPENSE IN BASE YEAR PLUS SUBSEQUENT YEAR(S) BY EXPENSE CATEGORY IN BASE YEAR

Base Year Expense Category	N	Percent of Claimants	Mean Expense Base Year	Mean Expense 1st Subq. Year	Mean Expense 2nd Subq. Year	Mean Expense 3rd Subq. Year
Low cost	30,362	94.25	$ 633	$ 977		
High cost	1,673	5.19	$ 8,981	$ 2,887		
Very high cost	178	0.55	$49,387	$12,101		
All claimants*	32,213	99.99	$ 1,336	$ 1,138		
Low cost	23,279	94.34	$ 623	$ 991	$1,003	
High cost	1,271	5.15	$ 9,010	$ 2,869	$3,272	
Very high cost	127	0.52	$46,949	$11,722	$7,966	
All claimants*	24,677	100.01	$ 1,293	$ 1,143	$1,155	
Low cost	15,828	94.25	$ 622	$ 975	$1,024	$ 942
High cost	869	5.17	$ 9,160	$ 3,102	$3,199	$2,480
Very high cost	97	0.58	$48,838	$10,734	$7,373	$5,418
All claimants*	16,794	100.00	$ 1,343	$ 1,141	$1,173	$1,047

*Percents may not total to 100.00 due to rounding error.

Table A-7

ALL 1981 CLAIMANTS VS. 1981 CLAIMANTS WHO WERE PLAN MEMBERS IN 1981-1984

1981 Expense Category	All 1981 Claimants			1981 Claimants Who Were Plan Members in 1981-1984		
	N	Percent of Total	1984 Mean Expense	N	Percent of Total	1984 Mean Expense
Low cost	26,581	94.16	$ 629	15,828	94.25	$ 622
High cost	1,480	5.24	$ 8,995	869	5.17	$ 9,160
Very high cost	170	0.60	$49,298	97	0.58	$48,838
All claimants	28,231	100.00	$ 1,361	16,794	100.00	$ 1,343

Three factors supported the decision to study fewer claimants with more years of data rather than more claimants with fewer years of data. First, the distribution of claimants by base year expense category was very similar, regardless of the number of subsequent years in which the claimant was a plan member (Table A-6). Second, the 16,794 claimants from 1981 with four complete years of data (60% of all 1981 claimants) closely resembled all 1981 claimants in terms of their distribution by expense category and mean expense (Table A-7). Finally, in reviewing the data presented in Table A-6 for each of the three groups of claimants (i.e., those with at least two, three or four complete, consecutive years of data), very few differences were observed between groups in either the mean expense or the percentage changes in the mean expense from the base year to the first subsequent year. For example, there was a 68% decline in the mean expense for high cost patients from year one to year two in each of the first two groups, and a 66% decline in the group with four years of data.

Based on considerations similar to those described for the subsequent-year analyses, the prior-year analyses focused on individuals who were claimants in 1984 and members of The Plan in all four years. As shown in Table A-8, there were 18,914 such individuals, almost 1,100 of whom were either high cost or very

Table A-8

MEAN EXPENSE IN BASE YEAR PLUS PRIOR YEAR(S) BY EXPENSE CATEGORY IN BASE YEAR

Base Year Expense Category	N	Percent of Claimants	Mean Expense Base Year	Mean Expense 1st Prior Year	Mean Expense 2nd Prior Year	Mean Expense 3rd Prior Year
Low cost	33,396	94.14	$ 650	$ 990		
High cost	1,885	5.31	$ 9,091	$ 3,070		
Very high cost	194	0.55	$52,293	$13,130		
All claimants	35,475	100.00	$ 1,381	$ 1,167		
Low cost	25,948	94.09	$ 646	$ 1,007	$ 850	
High cost	1,477	5.36	$ 9,114	$ 3,105	$2,533	
Very high cost	152	0.55	$52,576	$11,611	$8,140	
All claimants*	27,577	100.00	$ 1,386	$ 1,177	$ 980	
Low cost	17,830	94.27	$ 642	$ 1,043	$ 893	$ 814
High cost	981	5.19	$ 9,212	$ 3,122	$2,768	$2,382
Very high cost	103	0.55	$55,154	$12,059	$8,913	$5,143
All claimants*	18,914	100.01	$ 1,384	$ 1,210	$1,034	$ 919

*Percents may not total to 100.00 due to rounding error.

Table A-9

ALL 1984 CLAIMANTS VS. 1984 CLAIMANTS WHO WERE PLAN MEMBERS IN 1981-1984

1984 Expense Category	All 1984 Claimants			1984 Claimants Who Were Plan Members in 1981-1984		
	N	Percent of Total	1984 Mean Expense	N	Percent of Total	1984 Mean Expense
Low cost	26,669	94.12	$ 651	17,830	94.27	$ 642
High cost	1,523	5.37	$ 9,073	981	5.19	$ 9,212
Very high cost	143	0.50	$56,100	103	0.55	$55,154
All claimants	28,335	99.99	$ 1,383	18,914	100.01	$ 1,384

*Percents may not total to 100.00 due to rounding error.

high cost patients in 1984. These 18,914 claimants resembled all claimants in 1984 in terms of their distribution by expense category and their mean expenditure (Table A-9).

The final set of claimant analyses examined the distribution of inpatient, outpatient and total expenditures for high and very high cost patients by major diagnostic category. Hospital admissions and patient days were also distributed by major diagnostic category, as were outpatient visits and outpatient physician visits. These distributions indicated the relative contribution of each major diagnostic category to the expense and utilization experience of the high and very high cost patients. By studying the distributions in all four years, it was possible to determine if certain diagnostic categories were consistently responsible for a large proportion of expenses and/or utilization for the high cost and very high cost patients.

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RESEARCH REPORT

How Young Professionals Rank Employee Benefits: Two Studies

Benefit Preferences of Recent College Graduates

Organizational Choice: The Role of Job Characteristics

October 1988 **Grants for Research** **Report 88-2**

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Organizational Choice: The Role of Job Characteristics

Jill M. Pergande

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Benefit Preferences of Recent College Graduates

by Kermit R. Davis Jr., William F. Giles and Hubert S. Feild Jr.

Introduction

The purpose of the research described herein was to survey and analyze the benefit preferences of a national sample of college seniors. Previous research by the authors (see Davis, Giles, and Feild in *Compensation and Benefits Review*, 1985; in *Personnel Administrator*, 1985; and in *Vocational Guidance Quarterly*, 1985), conducted at a large southeastern university, had resulted in the following findings:

1. College seniors with different demographic, experience and motivational characteristics exhibited different patterns for preference of benefits.
2. Employment recruiters' perceptions (i.e., estimates) of college seniors' benefit preferences were significantly different from the students' actual preferences.
3. Certain characteristics of the recruiters were related to the accuracy of their perceptions of college seniors' preferences.

Therefore, the present study was an attempt to replicate the findings of this previous research and to see if the findings could be generalized beyond the Southeast to other parts of the country.

We believe that research on employee benefit preferences—and particularly the study of new college graduates—is important to employers in several ways. First, past research has indicated that benefits are important to college seniors in choosing an employer (Dunnette, Arvey and Banas, 1973; Huseman, Hatfield and Robinson, 1978; Powell, 1984). Therefore, it should be desirable for organizations and their agents (i.e., recruiters) to have knowledge of the preferences of these job candidates.

Second, recent research indicates that recruiters often hold misperceptions of what new college graduates want in terms of job attributes and benefit options (Davis, Giles and Feild, 1985; Giles and Feild, 1981; Goddard, 1986; Posner, 1981). It is hoped that information about the inaccuracy of perceptions will stimulate organizations to review their recruitment programs and attempt to improve them. Such endeavors as better training of recruiters, careful selection of personnel for recruitment jobs, implementation of more structured interviewing procedures and development of systematic media for communicating benefit options to job candidates (for example, brochures, pamphlets, videotapes and so forth) could have a positive impact on the effectiveness of recruitment.

Third, it has been estimated that the portion of labor costs related to employee benefits has risen to an average of about 37% in the United States (Wilson, Northcraft and Neale, 1985). Because expenditures for employee benefits are substantial, it is axiomatic that organizations would want to maximize the satisfaction of employees with their benefit options. Assuming a limited budget for the benefit package, most organizations will not be able to offer optimal benefit programs in all areas. Therefore, it would be beneficial to understand something about the *relative* preferences that employees have for various benefits and to know if there are *subgroups* of employees who prefer some benefits more than others.

Purpose of the Study

The focus of this research can be subdivided into *five* main areas:

Table I

COMPENSATION-BENEFIT OPTIONS

_____ Cost-of-living increase of at least $1,320 every year

_____ Early retirement at 62½ years of age (rather than 65) with the same benefits

_____ A starting salary of 6% over the average salary for your field

_____ Fifteen nonconsecutive days off with pay every year for personal use (not vacation)

_____ An increase in yearly retirement income from ½ to ¾ of average salary for your last three years of employment

_____ Four day workweek at the same salary (nine and one-half hours per day)

_____ Medical and life insurance premiums equal to $110 per month paid by the company

_____ Let you come to work anytime between 6 a.m. and 9 a.m. and leave anytime between 3 p.m. and 6 p.m. as long as you total 38 hours per week over five consecutive days

_____ Opportunity to buy 264 shares of company's stock for 80% of its market value every year (present market value is $25 per share; thus you could initially purchase each share for $20)

_____ Paid 15 week leave of absence every five years

_____ Three weeks of extra vacation with pay every year

1. To analyze the relative preferences of college seniors for 11 compensation-benefit options
2. To examine differences between the preferences of college seniors in three regions of the United States
3. To analyze the relationship between student characteristics (demographics and experiences) and benefit preferences
4. To examine the accuracy of personnel recruiters in estimating how college students value different benefits
5. To analyze the characteristics of recruiters that may be related to their perceptions of students' preferences.

Study Design and Results

Compensation-Benefit Alternatives

In the present study, 11 well-known benefit alternatives were chosen for the survey questionnaire. These particular employee benefits have been the subject of other research and would appear to represent the kind of options found in different organizations (see, for example, Brosnan, 1976; Huseman, Hatfield and Robinson, 1978; Johnson and Prieve, 1975; Rotondi, 1977; Schuster, 1969; Wilson, Northcraft and Neale, 1985).

The 11 benefit alternatives are shown in Table I as they appeared on the survey questionnaire. Each option is written in a manner that reflects an approximately equal cost to the employer. This approach was taken so that respondents would be stimulated to answer on the basis of their individual preference rather than from a purely "economic" perspective.

The respondents were asked to distribute a total allotment of 110 preference points among the 11 benefit options. Therefore, the preference responses indicate *relative* values of benefits rather than *absolute* values. In a realistic sense, most organizations have budgetary limitations on their benefit packages that will result in employees receiving less than a

maximum package. It should be desirable, therefore, for employers to have some idea about the relative value of different benefits offered to employees.

Limitations of Ipsative Measures

The benefit preference responses made by the subjects in this study represent *ipsative* scores (see Broverman, 1962; Cattell, 1944; Clemens, 1966; Hicks, 1970). Ipsative measurement yields scores in a set of variables such that each score is dependent on the other scores (Cattell, 1944). For example, when a student assigns 20 preference points (out of 110) to the medical-life insurance option, the amount of points that can be assigned to other benefit options is necessarily limited.

Because of the ipsative character of the preference scores, parametric statistical methods used for analyzing interval data could not be applied here. The reason for this limitation is that identical preference points given to a benefit option by different students may not represent an equivalent value in terms of the overall preference scale. For example, one student's score of 20 on the medical-life insurance option may be the highest number of points given to any benefit option by that individual. Another student may also have given the medical-life insurance option 20 points, but in addition assigned 20 points to four of the other benefit options. In this situation, it would be incorrect to say that the two students have an equal desire for medical-life insurance. The meaning of an ipsative score pattern lies *within* the individual's relative ordering of preference points and, therefore, does not represent an interval scale score (Cattell, 1944; Hicks, 1970).

In order to compare different respondents, the point scores were transformed into rank-order scores. These ranked preferences allowed us to use nonparametric statistical procedures (Siegel, 1956) in analyzing the data.

One important asset of using the point distribution approach to measure preferences is that respondents were not forced to rank order the benefits on a continuum from one to 11. Instead, the respondents could assign equal points to any number of benefit preferences, thereby allowing them to express indifference among subsets of the benefit alternatives.

Student Characteristics

In order to optimize the benefit offerings to employees, organizations may want to know if there are subgroups of individuals who differ in their preferences for various benefits. This knowledge should allow the employer to retain some design flexibility in the benefit package.

Past research has indicated mixed findings with respect to the individual characteristics that may be related to benefit preferences. A review of published research indicates that a number of demographic and experience variables appear to be related to benefit choices. Findings have included the following:

1. *Gender* (Davis *et al.*, 1985; Huseman *et al.*, 1978; Johnson and Prieve, 1975; Schuster, 1969)
2. *Age* (Goodale and Aagaard, 1975; Huseman *et al.*, 1978; Johnson and Prieve, 1975; Schuster, 1969)
3. *Job experience* (Davis *et al.*, 1985; Lewellen and Lanser, 1973; Schuster, 1969)
4. *Marital status* (Goodale and Aagaard, 1975; Huseman *et al.*, 1978; Nealy and Goodale, 1967; Schuster, 1969)
5. *Number of children* (Huseman *et al.*, 1978; Schuster, 1969)
6. *College major* (Davis *et al.*, 1985; Johnson and Prieve, 1975).

In our study, 11 demographic and experiential variables were selected as potential correlates of graduating seniors' benefit preferences. These characteristics are shown in Table II. In addition to the variables of sex, age, marital status, dependents, job experience and college major that have been found in past research, our study also included academic grade point average, personal financing of education, part-time work during college and membership in campus organizations. These variables were exploratory in nature.

Recruiter Perceptions of Student Preferences

Previous research has indicated that personnel recruiters who interview through the college placement center may incorrectly perceive the kinds of job characteristics or benefits that college seniors want (Davis *et al.*, 1985; Giles & Feild, 1982; Harlan, Kerr & Kerr, 1977; Posner, 1981). If this is true, recruiters may not provide complete and realistic information about all relevant compensation and noncompensation rewards to applicants, or to seek information from the students about their re-

Table II

STUDENT RESPONDENT CHARACTERISTICS: DEMOGRAPHIC AND EXPERIENCE VARIABLES

_____ 1. Your sex? (1) Female (2) Male

_____ 2. Your age?

_____ 3. Marital status? (1) Single (2) Married

_____ 4. Number of dependent children?

_____ 5. College degree being pursued? (1) Bachelor's (2) Master's (3) Other

_____ 6. Academic major (school)?

(1) Agriculture/Forestry
(2) Architecture
(3) Business
(4) Education
(5) Engineering
(6) Fine Arts
(7) Humanities
(8) Home Economics
(9) Nursing
(10) Physical Sciences
(11) Social Sciences
(12) Other

_____ 7. Overall *Grade Point Average* (4.00 average is equal to an A)?

(1)	(2)	(3)	(4)	(5)
Below 2.00 (D)	2.00-2.50 (C to C+)	2.51-3.00 (C+ to B)	3.01-3.50 (B to B+)	3.51-4.00 (B+ to A)

_____ 8. How many *months* (convert years to months) of full-time work experience have you had? (Include co-op work programs and military experience; do not include summer jobs.)

_____ 9. What *percentage* of your college expenses have you paid through jobs you have held and through loans which you personally will have to repay? (Do not include money from scholarships.)

_____ 10. While attending college, how many *hours* per week have you been employed for pay (on the average)?

_____ 11. During college, in how many university-related organizations did you participate? (Include social, religious, academic, vocational, professional and student government.)

ward preferences. A lack of clear communication about potential rewards could result in a mismatch between the job and the person or in posthiring disillusionment and dissatisfaction (Breaugh, 1981; O'Reilly and Caldwell, 1981; Wanous, 1977).

Although past research has indicated the inaccuracy of the perceptions of recruiters about students' preferences, a lack of evidence currently exists about the reasons for those misperceptions. A study by Davis, Giles, and Feild (1985) found that recruiters' *job experience* was negatively related to the accuracy of their estimates of students' job and benefit preferences. That is, *less* experienced recruiters were more accurate than were *more* experienced recruiters. The factors of *recruiter specialization, line versus staff experience* and *frequency of recruitment trips* were found to be unrelated to perceptual accuracy.

In the present study, the variables of age and sex will be examined in addition to the four recruiter characteristics previously discussed. The research in 1985 by Davis, Giles and Feild did not allow an

Table III

RECRUITER RESPONDENT CHARACTERISTICS: DEMOGRAPHIC AND EXPERIENCE VARIABLES

_____ 1. Your sex? (1) Female (2) Male

_____ 2. Your age?

_____ 3. How many *months* have you been with your present organization? (Please convert years to months.)

_____ 4. Do you presently hold a line or staff position? (1) Line (2) Staff

_____ 5. In which one of the following areas is your present job?

(1) Sales or marketing
(2) Production
(3) Accounting or finance
(4) Personnel or industrial relations
(5) Engineering
(6) Other (please specify) _____

_____ 6. How many months have you been in the job area that you checked above? (Please convert years to months.)

_____ 7. Approximately how many recruiting visits have you made to college or university campuses during the past three years?

_____ 8. Considering all of your recruiting interviews on college campuses, please list the approximate percentages of the interviews you have had with students in each of the following areas of study (your percentages should total 100%).

_____% Agricultural
_____% Architecture
_____% Business
_____% Education
_____% Engineering
_____% Fine Arts or Humanities
_____% Physicial Sciences
_____% Social Sciences
_____% Other

opportunity to compare male and female recruiters because of the lack of females in the sample. The recruiter characteristics are displayed in Table III as they appeared on the survey questionnaire.

Study Samples

Students

The final student sample was comprised of 602 respondents. Of this sample, 107 students were from the Midwest, 112 were from the Northeast and 383 were from the Southeast. The demographic characteristics and college experiences of the respondents were summarized and are presented in Table IV. Because of the unequal sample sizes, we decided to randomly select a specific number of students from each region to use in subsequent statistical analyses. This approach has been recommended where severely different sample sizes exist in order to minimize the effects of unequal score variances on the response variables, called heteroscedasticity (Hays, 1971). Therefore, the 11 regional samples were made equal in size by randomly sampling from each region. The regional samples were set at 107 students each, which is the number of students in the smallest regional sample (i.e., Midwest).

The characteristics of the revised total sample and regional samples are shown in Table V. Of interest here is that students from the three regions differ significantly in terms of several demographic and experience variables. These differences are described as follows:

1. The Northeast sample had a significantly larger ratio of male to female students than do the other two regions.
2. The Southeast region had significantly more business majors, and the Northeast had significantly more engineering majors.
3. There was a significantly different rank order

Table IV

CHARACTERISTICS OF STUDENT SAMPLE (ORIGINAL DATA)

		Total Sample (n=602)	Southeast (n=383)	Midwest (n=107)	Northeast (n=112)
Variables:					
1. Gender	Males	350 (58%)	215 (56%)	60 (56%)	75 (68%)
	Females	249 (42%)	167 (44%)	47 (44%)	35 (32%)
2. Age	Average	22.3 years	22.5 years	23.1 years	22.4 years
	Below 24	(87%)	(87%)	(84%)	(89%)
3. Marital	Single	556 (92%)	346 (91%)	100 (94%)	104 (95%)
	Married	46 (8%)	35 (9%)	6 (6%)	5 (5%)
4. Children	Average	0.3	0.6	0.2	0.4
	None	585 (97%)	372 (97%)	106 (99%)	107 (96%)
5. Degree	Bachelor	557 (93%)	361 (95%)	99 (92%)	97 (89%)
	Graduate	40 (7%)	20 (5%)	8 (8%)	12 (11%)
6. Major	Business	436 (73%)	342 (90%)	56 (53%)	38 (35%)
	Engineering	101 (17%)	26 (7%)	19 (18%)	56 (51%)
	Social Sciences	35 (6%)	6 (2%)	20 (19%)	9 (8%)
7. GPA	B+ to A	49 (8%)	22 (6%)	10 (9%)	17 (15%)
	B to B+	168 (28%)	75 (20%)	40 (37%)	33 (48%)
	C+ to B	205 (34%)	125 (33%)	47 (44%)	33 (30%)
	C to C+	167 (28%)	150 (39%)	10 (9%)	7 (6%)
	D	9 (2%)	9 (2%)	0 (0%)	0 (0%)
8. Work experience	Average	1.1 years	1.1 years	1.5 years	.84 years
	Below 1 yr.	(70%)	(69%)	(64%)	(81%)
9. Part-time jobs	Average	10.3 hrs.	9.4 hrs.	14.4 hrs.	9.2 hrs.
	Less 10 hrs.	(46%)	(51%)	(24%)	(48%)
	10-20 hrs.	(41%)	(36%)	(59%)	(45%)
	More 20 hrs.	(13%)	(13%)	(17%)	(7%)
10. Self-financed college	Average	40%	31%	53%	56%
	Less 10%	(28%)	(39%)	(8%)	(9%)
	10-40%	(30%)	(29%)	(37%)	(44%)
	Over 40%	(2%)	(32%)	(55%)	(47%)
11. College organizations	Average	3.2	3.2	3.0	3.1
	0 to 1	(22%)	(24%)	(24%)	(16%)
	2 to 4	(56%)	(54%)	(61%)	(59%)
	5 or more	(22%)	(22%)	(15%)	(25%)

Table V

CHARACTERISTICS OF STUDENT SAMPLE (SAMPLED DATA)

		Total Sample (n=321)	Southeast (n=107)	Midwest (n=107)	Northeast (n=107)	Analysis Difference
Variables:						
1. Gender	Males	185 (58%)	54 (51%)	60 (56%)	72 (67%)	*
	Females	134 (42%)	53 (49%)	47 (44%)	33 (31%)	
2. Age	Average	22.4 years	22.7 years	22.6 years	21.9 years	n.s.
	Below 24	(85%)	(82%)	(84%)	(89%)	
3. Marital	Single	294 (92%)	95 (89%)	100 (94%)	99 (93%)	
	Married	23 (8%)	12 (11%)	7 (6%)	8 (7%)	
4. Children	Average	.03	.06	.01	.07	n.s.
	None	309 (96%)	101 (94%)	.06 (99%)	.02 (95%)	
5. Degree	Bachelor	292 (91%)	101 (94%)	99 (93%)	92 (86%)	n.s.
	Graduate	26 (8%)	6 (6%)	8 (7%)	12 (11%)	
6. Major	Business	182 (57%)	90 (84%)	56 (52%)	36 (34%)	***
	Engineering	81 (25%)	9 (8%)	19 (18%)	53 (50%)	
	Social Sciences	32 (10%)	3 (3%)	20 (19%)	9 (8%)	
7. GPA	B+ to A	32 (10%)	7 (9%)	10 (9%)	15 (14%)	***
	B to B+	108 (34%)	18 (17%)	40 (37%)	50 (47%)	
	C+ to B	116 (36%)	36 (34%)	47 (44%)	35 (33%)	
	C to C+	57 (18%)	5 (5%)	0 (0%)	0 (0%)	
	D	5 (2%)				
8. Work experience	Average	1.2 years	1.3 years	1.5 years	.82 years	n.s.
	Below 1 yr.	(70%)	(66%)	(64%)	(80%)	
9. Part-time job	Average	11.1 hrs.	9.5 hrs.	14.4 hrs.	9.5 hrs.	***
	None	(32%)	(44%)	(18%)	(35%)	
	1 to 10 hrs.	(19%)	(15%)	(15%)	(24%)	
	11-20 hrs.	(37%)	(30%)	(50%)	(33%)	
	Over 20 hrs.	(12%)	(11%)	(17%)	(8%)	
10. Self-financed college	Average	47%	31%	53%	56%	***
	Less 10%	(17%)	(34%)	(8%)	(8%)	
	10-40%	(34%)	(36%)	(37%)	(29%)	
	Over 40%	(50%)	(30%)	(55%)	(63%)	
11. College organizations	Average	3.2	3.2	3.0	3.3	n.s
	0 to 1	(21%)	(23%)	(25%)	(15%)	
	2 to 4	(59%)	(56%)	(61%)	(60%)	
	5 or more	(20%)	(21%)	(15%)	(25%)	

Note: Because of missing responses, the frequency distributions may not equal the total sample for some.
*=.05 probability level.
***=.001 probability level.

of GPA distributions among the three regions with the Northeast being *first*; the Midwest, *second*; and the Southeast, *last*.

4. The students from the Midwest had significantly more part-time work during college than did students from the other regions.
5. The students from the Southeast had a significantly lower percentage of personal financing of college expenses than did students from the other two regions.

Because of the differences among the regions in terms of demographics and experiences, statistical analyses of the relationships between student characteristics and benefit preferences had to consider the effects of regional differences.

For example, before an analysis of the relationship between college major and the 11 benefit preferences was made, the relationship was examined *within* each region. This was necessary because the regions differed in the number of students in each *major* field. Therefore, any differences in benefit preferences related to the college major variable might be caused by underlying regional differences in benefit preferences. (Findings from these analyses will be presented in a subsequent section of the report.)

Recruiters

The recruiter sample was comprised of 486 respondents. Of this sample, 108 recruiters were from the Southeast, 60 were from the Midwest, and 318 were from the Northeast. Characteristics of the recruiter sample are shown in Table VI. The research questions based on the responses from recruiters were as follows:

1. To assess the accuracy of recruiters' estimates of college students' benefit preferences
2. To analyze the relationship of recruiter demographic and experience characteristics with the accuracy of their perceptions.

It was desirable to have as large a sample as possible in order to have adequate representations of the demographic and experience variables. Therefore, the total sample of recruiters was used. Unlike the approach taken with the student sample, we did not randomly select equal subsamples from the three geographical regions of the country.

Student Benefit Preferences

The *average* number of preference points assigned to each of the 11 benefit alternatives is shown in Table VII. This table also indicates how the students from the three geographical regions assigned their preferences. With respect to the total sample it appears that medical-life insurance was the most favored benefit, closely followed by cost-of-living increases and higher starting salary. These three preferences, all of which are *monetary* benefits, are valued approximately twice as much as some of the *time*-oriented benefits such as early retirement, four day week and leave of absence. This finding is consistent with the results of an earlier benefit study by Davis *et al.* (1985).

Table VII also indicates that students from the three geographical subgroups had very similar preferences for benefits. The only benefit alternative for which there was a significant difference among the regions was flex time. The 16 students from the Northeast ranked this benefit slightly higher than did students from the other two regions.

One implication of these results is that managers of geographically dispersed organizations may have reason to feel confident that a uniform company benefit plan will appeal to employees in different locations. Likewise, organizations that recruit college graduates from different parts of the country should be able to assume that regional preferences will not undermine the design of a uniform benefit package.

Second, it is noteworthy that medical-life insurance was valued higher than the two salary-related options, cost of living and a higher starting salary. Apparently, college students are aware of the high costs of medical and physician services today, and they appreciate monetary value of cooperative insurance programs.

Correlates of Student Preferences: Subgroup Analyses

As we discussed in the introduction section, an important aspect of this research was to analyze the relationships between benefit preferences of college seniors and selected demographic and experience variables. Because the regional subsamples differed in terms of some of these individual characteristics, statistical analyses of the relationship between preferences and characteristics were first undertaken *within* each regional sample. If the relationship between any particular student characteristic and any benefit preference was different for the different

Table VI

CHARACTERISTICS OF RECRUITER

		Total Sample (n=487)	Southeast (n=108)	Northeast (n=318)	Midwest (n=60)
Variables:					
1. Gender	Males	369 (76%)	86 (80%)	240 (76%)	43 (72%)
	Females	115 (24%)	21 (20%)	77 (24%)	17 (28%)
2. Age	Average	35.9	34.4	36.5	36.0
	30 or below	149 (33%)	43 (40%)	92 (29%)	24 (40%)
	31 to 40	192 (40%)	38 (35%)	134 (42%)	20 (33%)
	41 to 50	98 (20%)	20 (19%)	66 (21%)	12 (20%)
	51 or over	37 (7%)	6 (6%)	26 (8%)	4 (7%)
3. Seniority	Average	8.9	7.3	9.5	8.4
	Below 4 yrs.	147 (31%)	43 (43%)	84 (27%)	20 (33%)
	4 to 8 yrs.	131 (28%)	20 (20%)	84 (26%)	18 (30%)
	8 to 15 yrs.	112 (23%)	24 (24%)	86 (27%)	11 (19%)
	Over 15 yrs.	96 (28%)	13 (13%)	63 (20%)	11 (18%)
4. Line or Staff	Line	165 (35%)	28 (30%)	113 (36%)	24 (40%)
	Staff	301 (65%)	67 (70%)	198 (64%)	36 (60%)
5. Job Specialization					
Sales marketing		59 (12%)	12 (12%)	40 (13%)	7 (12%)
Production		12 (3%)	3 (3%)	8 (2%)	1 (1%)
Accounting/finance		30 (6%)	4 (4%)	17 (6%)	9 (15%)
Personnel/indus. relations		195 (41%)	43 (43%)	130 (41%)	22 (37%)
Engineering		96 (20%)	21 (21%)	67 (21%)	8 (13%)
Other		85 (18%)	17 (17%)	55 (17%)	13 (22%)
6. Job Experience	Average	6.8	6.1	7.0	6.8
	0 to 2 yrs.	104 (22%)	22 (22%)	69 (22%)	13 (22%)
	2 to 5 yrs.	135 (28%)	29 (30%)	86 (27%)	20 (3%)
	5 to 10 yrs.	124 (26%)	27 (27%)	83 (26%)	14 (23%)
	10 to 13 yrs.	52 (11%)	14 (14%)	37 (12%)	6 (10%)
	Over 15 yrs.	71 (13%)	7 (7%)	42 (13%)	7 (12%)
7. Recruiting Visits	Average	12.5	13.8	12.1	12.3
	Below 5	236 (48%)	56 (52%)	153 (48%)	27 (45%)
	5 to 15	149 (31%)	28 (26%)	102 (32%)	19 (32%)
	16 to 30	57 (12%)	16 (15%)	34 (11%)	7 (11%)
	Over 30	44 (9%)	8 (7%)	29 (9%)	7 (12%)
8. Recruiting Fields	Averages				
Agriculture		1.3%	1.1%	1.6%	.2%
Architecture		.1%	.1%	.0%	.3%
Business		32.4%	26.7%	30.8%	51.5%
Education		2.6%	.8%	3.5%	.9%
Engineering		40.2%	45.6%	50.2%	25.8%
Fine Arts/Humanities		1.7%	.8%	1.7%	3.2%
Physical Sciences		2.9%	2.5%	2.8%	4.1%
Social Sciences		1.9%	1.0%	2.1%	2.7%
Other		6.0%	4.1%	6.3%	8.1%

Table VII

BENEFIT PREFERENCES: TOTAL SAMPLE AND REGIONS

	Total Sample (321)	Southeast (107)	Northeast (107)	Midwest (107)	Analysis of Difference
Alternative:					
Cost of living	13.82	13.21	13.57	13.69	n.s.
Early retirement	5.91	5.00	7.07	5.65	n.s.
Starting salary	12.25	12.76	10.85	12.13	n.s.
Days off	9.37	9.53	9.55	9.02	n.s.
Pension	10.32	10.14	10.34	10.47	n.s.
Four day week	6.60	6.92	5.41	7.48	n.s.
Medical-life insurance	14.66	14.39	14.08	15.51	n.s.
Flexitime	10.36	9.02	11.74	10.33	.05
Stock options	10.03	9.49	9.98	10.61	n.s.
Leave of absence	7.61	8.79	7.45	6.59	n.s.
Vacation	10.63	10.56	10.36	10.98	n.s.

subgroups, this finding would hinder interpretations made for the total sample.

Subgroup analyses were carried out for the variables of gender, major, GPA, part-time work and self-financing. These five characteristics were the only variables where significant differences were found among the regions. The results of the subgroup analyses are described as follows.

Gender

The Mann-Whitney *U* Test (Siegel, 1956) was performed to examine whether males and females differed in their rank orders of the 11 benefits. In the samples from the Southeast and Northwest, no significant differences were found. In the sample from the Midwest, female students ranked the preference for days off (extra days) significantly higher than did the male students ($p < .05$). The male students ranked company stock significantly higher than did the female students ($p < .05$). Based on these results, it would appear that in the total sample male and female students have very similar benefit interests. Nevertheless, the differences between males and females on two benefit preferences in the sample from the Midwest might alert compensation planners to consider specific regional differences. Still, without controlling for other characteristics of the males and females in the sample from the Midwest, such as college major, work experience and so forth, it is not possible to conclusively say that our finding represents a purely *gender* difference.

College Major

The Kruskal-Wallis One Way ANOVA for ranked data (Siegel, 1956) was used to analyze differences in the 11 preference ranks among *three* college major categories. These categories were business, engineering and social sciences. Although 12 college majors were included in the survey questionnaire, a response frequency analysis indicated that approximately 92% of the students fell into three academic categories.

In the sample from the Southeast, no significant differences were found among the majors on any of the benefit preferences. In the sample from the Northeast, only the benefit of the four day week had a significant difference among the groups. ($p < .05$). Here, students in the social sciences ranked this benefit higher than did business or engineering majors. Nevertheless, because of the small sample size of the social science group (only nine students), this finding could be a sampling artifact. In the sample from the Midwest, only one of the 11 benefits had a significant differentiation in rank among the three academic categories. This benefit was vacation ($p < .05$). Here, the social science students had

a significantly lower rank than did either the business or engineering students.

Overall, these results tend to suggest that the academic major of college students is not highly related to their benefit preferences. This appears to hold true for different regions of the country.

GPA

The Kruskal-Wallis One Way ANOVA for ranked data was used to analyze the differences in the 11 benefit preferences among five grade point average categories. These groups were bracketed in terms of a hierarchy of grades that included (1) D, (2) C to C+, (3) C+ to B, (4) B to B+ and (5) B+ to A. In the sample from the Southeast, one significant difference was found. The benefit preference was early retirement ($p < .05$). The B+ to A students and the C+ to B students had higher ranks on this benefit than the other grade brackets.

In the sample from the Northeast, two significant differences were found. First, the B+ to A students had a significantly lower rank for medical-life insurance ($p < .05$) than any of the other GPA categories. Second, the C+ to B group and the B+ to A group had significantly lower ranks on flex time ($p < .05$) than did students in the other grade groupings. In the sample from the Midwest, students in the highest grade category (B+ to A) ranked early retirement significantly lower ($p < .05$) than the other four GPA categories.

In summarizing these results, it is somewhat difficult to interpret the differences in preferences tied to GPA. In some instances the results from different regions were directly contradictory. For example, in the Southeast region, the highest GPA group (B+ to A) ranked early retirement significantly higher than did three of the other GPA categories. In the sample from the Midwest, however, the highest GPA group ranked this same benefit *lower* than did the other GPA categories.

Actually, the total number of statistically significant differences in preferences among the GPA groups in the three regional samples was small (four significant differences) in comparison to the total number of potential differences. By chance, at least two significant differences would be expected (i.e., 5% probability times 33 potential differences).

Part-Time Work

The variable, part-time work, was measured on an interval scale by asking students how many hours of a typical week they were employed during their college careers. The relationship between this variable and each benefit preference was analyzed by computing a Spearman rank-order correlation. In the sample from the Southeast, one significant correlation was found. Part-time work hours had a significant negative relationship ($p < .05$) of $-.22$ with leave of absence. That is, students who had fewer part-time work hours ranked this benefit higher than did students with more work hours.

In the sample from the Northeast, a significant relationship of .19 ($p < .05$) was found between part-time work and the four day week. This indicates that students with more part-time work hours ranked this benefit higher than did students with less work hours. Finally, in the group from the Midwest, a significant negative correlation of $-.17$ ($p < .05$) was found between part-time work and flex time. That is, students with more work hours ranked this benefit lower than did students with fewer work hours.

Self-Financing of College

The relationship between self-financing of college by students and their 11 benefit preferences was analyzed by computing Spearman rank-order correlations. In the Southeast region, a significant negative correlation of $-.17$ ($p < .05$) was found for leave of absence. That is, students with a lower percentage of self-financing ranked this benefit higher. In the sample from the Northeast, no significant differences were found between self-financing and the 11 benefit preferences. In the sample from the Midwest, significant differences were found for pension ($-.16$ at $p < .05$) and the four day week (.23 at $p < .01$).

Interpretation of Subgroup Analyses

In summarizing the results of the regional subgroup analyses, it would appear that the relationships between the student characteristics (demographic and experiential) and the 11 benefit preferences are very similar for the Southeast, Northeast and Midwest. The differences that do appear could be a function of sampling error rather than because of real regional differences. For example, there were 165 possible significant relationships between the student characteristics and the benefit preferences across three regions (i.e., five

Table VIII

ANALYSIS OF DIFFERENCES BETWEEN STUDENTS' PREFERENCES AND RECRUITERS' ESTIMATES OF THOSE PREFERENCES[a]

Benefits:	Students	Recruiters	Mann-Whitney
Cost of living	13.82	13.81	n.s.
Early retirement	5.91	4.28	***
Starting salary	12.25	19.33	***
Day off	9.37	7.68	**
Pension	10.32	4.62	***
Four day week	6.60	9.49	***
Med-life insurance	14.66	12.20	**
Flexitime	10.36	10.58	n.s.
Stock options	10.03	9.19	n.s.
Leave of absence	7.61	5.77	***
Vacation	10.63	10.18	n.s.

a. Figures in table are average points assigned to a preference by that group.
Note: ** = .01 probability level.
*** = .001 probability level.

student variables × 11 benefit alternatives × three regions). The results indicated a total of 12 statistically significant relationships. By chance alone, one might expect eight significant relationships (5% of 165).

In addition to the findings from the subgroups analyses, it was shown previously (Table VII) that students in the three regions differed significantly on only one of the 11 benefit preferences. Therefore, in summarizing the findings related to regional comparisons, it would appear that the students from the three regions have very small differences in their benefit preferences, and in the relationships between their preferences and personal backgrounds.

Relationships Between Preferences and Student Characteristics

Total Sample

Because the regional differences appeared to be relatively small, we decided to analyze the relationships between student preferences and student characteristics for the total sample of students. For these analyses, eight of the 11 student characteristics were used. The variables of marital status, number of dependents and type of college degree were not examined because the majority of students answered these questions in one way (see Table IV for distributions).

Different statistical tests were used in analyzing the relationships because of the different scaling properties of the student variables. First, the variable of gender was analyzed using the Mann-Whitney *U* test. This procedure was used to examine the difference in average rank between males and females on each preference variable. Second, the variables of college major and GPA were analyzed by using the Kruskal-Wallis Analysis of Variance for ranked data. This procedure examines the differences in average ranks among more than two categories. For example, there were three college major categories and five grade point average categories that were compared.

Finally, because the variables of age, work experience, part-time work, self-financing and college organizations were scaled on a continuum, the Spearman rank-order correlation was used to analyze the relationships with the 11 preference variables. Results of these analyses are shown in Table VIII and are described in some detail below.

Gender

Male and female students differed significantly on two of the benefit preferences: starting salary and stock ownership. The average female student awarded 13.9 points to the starting salary benefit versus 11.0 points for male students.

In contrast, the average male gave 10.8 points to the stock benefit whereas the average female assigned 9.0 points. The finding that males have a higher preference for stock ownership as compared with females is consistent with an earlier regional study by Davis *et al.* (1985). One interpretation of this result is that female graduates may not perceive the importance of benefits aimed at long term financial security because they may not consider themselves as long term "breadwinners." As national statistics indicate, however, the percentage of females who *are* the primary source of financial support for themselves and their families has risen to about 40%. Therefore, it should be beneficial to these females (and male employees as well) for benefit administrators to provide information about the value of long term financial benefits such as stock options, pensions, thrift plans and the like.

College Major

The three college major categories differed significantly on two benefit preferences. First, students majoring in business and the social sciences (i.e., psychology, political science, history and so forth) gave significantly more preference points to the four day week (7.2 and 8.3) than did the engineering students (5.2). Second, the business and engineering students assigned significantly more points to the vacation benefit (11.0 and 11.3) than did the social science students (7.1).

GPA

The grade point averages of students were related to one benefit preference: leave of absence. Students who fell into the grade categories of D and C− to C+ gave more preference points (12.0 and 10.1) to this benefit than did students in the higher grade categories (7.6, 6.4 and 7.5, respectively). Perhaps this finding indicates an avoidance tendency by students with lower grades in college. Nevertheless, implications for any specific benefit strategy related to these students would be difficult to make.

Age

The variable of age was significantly correlated with days off (−.22) and with leave of absence (.10). This means that younger students preferred extra days off slightly more than older students; older students had a slightly greater preference for leaves of absence compared with the choice of younger students. It may be plausible to suspect that a preference for more days off represents less involvement in the job and that a desire for leave of absence may manifest a need for new career challenges or a more stimulating environment.

Among older students there are probably many who are returning to college to seek advanced knowledge in their career field or to prepare for a different career. Therefore, these individuals may appreciate the value of a sanctioned leave of absence that allows time for vocational development.

Work Experience

Work experience had a significant negative correlation of −.10 with cost-of-living increases. Students with more years of work experience gave fewer preference points to the cost-of-living option.

One plausible interpretation of this finding may be that students with little job or work experience are responding on the basis of the national media attention given to inflation as a political issue.

Part-Time Work

The number of hours of part-time work during college was correlated significantly with the benefit option of the four day week (.10). This indicates that students who worked a lot during college preferred a reduced workweek more than did students who engaged in less part-time work.

Self-Financing of College

The self-financing variable had significant correlations with the options of flex time (.11) and leave of absence (−.25). That is, students who assumed a greater share of the financing of their college expenses preferred a flexible work schedule more and leaves of absence less than did students whose college expenses were paid for by other people.

These findings may indicate that various kinds of time off are preferred for different underlying reasons. For example, self-financing of college may

represent a responsibility or diligence trait, and students who score highly prefer more self-control over their work lives (e.g., flex time) rather than time away from their jobs (e.g., leaves of absence).

College Organizations

The number of college organizations joined by students was not significantly related to any of the benefit preferences. This finding was in agreement with the previous benefit study by Davis *et al.* (1985).

Because college organizations differ widely in their purposes and membership, an index of the total number of organizations joined by students may not meaningfully capture the individual differences in motivation to join.

Accuracy of Recruiter Estimates of Students' Preferences

As previously discussed, a major focus of the study was to examine the perceptions that recruiters had of the benefit preferences of typical students and the accuracy of those perceptions.

The preference point allocations made by students to each benefit option were compared with the estimates of preference points by recruiters. The differences were analyzed for statistical significance using the Mann-Whitney *U* Test.

As shown in Table VIII, the estimates of recruiters were significantly different from the actual preferences of students for seven of the 11 benefit options. Recruiters were highly accurate in their estimates for the benefits of cost of living, flex time, stock options and vacations. But the recruiters were highly inaccurate on several preference estimates. For example, recruiters allocated nearly twice as many preference points to starting salary (19.33) as the average student allocated to that benefit (12.25). And, students assigned more than twice as many preference points (10.32) to pensions as compared with the average recruiter's estimate (4.62).

In an earlier regional study by Davis *et al.* (1985), recruiters had displayed a patterned tendency to overestimate the value of *time-related* benefits. Nevertheless, this pattern was not as strongly exhibited in the present results. For example, in the previous study, recruiters had significantly overranked the options of vacations and flexible work hours. But in the current study, the estimates of recruiters were very close, on the average, to the preferences of students.

One consistent finding across the two surveys is that recruiters continue to *underestimate* the importance of medical-life insurance and retirement plans to students. Perhaps younger employees have come to value income protection programs as a result of quality-of-life trends such as expectations for a longer life and a societal emphasis on health and fitness.

Characteristics Related to Recruiter Accuracy

In a previous study by Davis *et al.* (1985), a number of recruiter demographic and job experience variables were assessed for their association with recruiter accuracy. Only one variable was found to be related to the accuracy of recruiter preference estimates: *job experience*. Actually, less experienced recruiters were found to be slightly more accurate than were more experienced recruiters.

Multiple Regression

In the present study, *six* variables were used in a prediction model to analyze the relationship between the characteristics of recruiters and the accuracy of the recruiters. The variables were sex, age and line versus staff, number of recruiting visits (three year period), seniority (present company) and job experience.

A measure of accuracy for each recruiter was derived by (1) squaring the difference between each recruiter's estimate and the *average* student preference for *each* benefit option and (2) summing the squared differences across the 11 options. The resulting D^2 measure represents a relative index of the accuracy of recruiters. This index was used as the *dependent* variable in a multiple regression analysis, with the six characteristics of recruiters previously described as *independent* variables (i.e., predictors).

The regression results indicated that none of the recruiter variables were significantly related to the measure of recruiter accuracy. This finding suggests a need for further research of *how* recruiters develop their perceptions of the benefit preferences of students. Such factors as (1) recruiter training, (2) recruiter interview procedures or style, (3) recruiter knowledge of compensation programs or (4) other

Table IX

SUMMARY OF REGRESSION MODELS:
RELATIONSHIPS OF RECRUITER CHARACTERISTICS
TO ACCURACY OF 11 PREFERENCE ESTIMATES[a]

Dependent Variable	Statistically Significant Predictor Variables[b]	R Value	Probability Test
Cost of living	Age(+)	.11	.05
Early retirement	Line–Staff(+), Age(+)	.15	.01
Starting salary	Visits(+), Experience(−), Line–Staff(−), Seniority(−)	.21	.001
Days off			n.s.
Pension			n.s.
Four day week	Age(+)	.14	.01
Medical-life			n.s.
Flexible time			n.s.
Stock options			n.s.
Leave of absence			n.s.
Vacation			n.s.

a = Accuracy was expressed as the D^2 for each option.
b = Plus or minus sign in parentheses indicates the direction of relationship for that variable.

"process" variables may be able to explain the perceptual accuracy of recruiters better than will the demographic and job experience characteristics studied here.

Separate Preference Analysis

In the preceding multiple regression model, six characteristics were used to predict the *overall* accuracy of recruiters' estimates. Nevertheless, it is plausible that subgroups of recruiters may be accurate in their estimates of some benefit preferences, but not of others. Therefore, we decided to examine separate multiple regression models for the prediction of recruiter accuracy for each of the 11 benefit preferences. The results of the separate regression analyses are shown in Table IX. The results indicate that the accuracy of recruiters' estimates were significantly related to the characteristics of recruiters for four of the 11 benefit options. For the benefit, cost of living, the *age* of the recruiter was found to be related to accuracy of estimation. The positive direction of this relationship means that younger recruiters were more accurate in estimating the value of this benefit to students than were older recruiters. (Remember that a *small* D^2 index represents greater accuracy.)

For the benefit of early retirement, recruiters who were in line positions (nonpersonnel) and who were younger had greater accuracy in their estimates than did recruiters who were in personnel positions and who were older.

The third benefit to indicate a relationship between the accuracy of recruiters and the characteristics of recruiters was starting salary. In this prediction model, four predictor variables were significantly related to accuracy. These variables were as follows:

1. Number of visits (past three years)

2. Job experience
3. Line versus personnel job
4. Company seniority.

The directions of the relationships for the predictor variables indicated that the more accurate recruiters tended to be personnel specialists who have more company seniority and job experience, and who have made fewer campus visits over the past three years. These results may indicate that the more senior and experienced personnel managers (who tend to make fewer visits to campuses each year) are more knowledgeable about the salary demands of new college graduates than are less experienced recruiters.

The fourth benefit to show a significant relationship between the accuracy of recruiters and the characteristics of recruiters was that of the four day week. In this case, younger recruiters were more accurate in their estimates than were older recruiters.

The implications of these findings are that certain characteristics of recruiters (such as age and work experience) may be related to the accuracy of their perceptions of specific benefit preferences. The finding here that age was *negatively* related to the accuracy of recruiters for three preference estimates is consistent with an earlier study by Davis *et al.* (1985). Apparently, recruiters who are closer in age to college seniors have a better grasp of the preferences these students have for certain types of benefits. Nevertheless, being younger did not allow these recruiters to make more accurate preference estimates of eight of the 11 benefit options.

The finding that recruiters who were personnel specialists with greater seniority and job experience had more accurate perceptions of students' preferences for a higher starting salary may indicate a learning or training effect. That is, these recruiters would likely have been involved in the initial salary negotiations with college graduates and have become knowledgeable about this aspect of compensation. If this interpretation is true, it follows that one way to increase the accuracy of recruiters' perceptions of the benefit preferences of new college graduates would be to directly survey these preferences periodically and to include some kind of benefit questionnaire or questions in the employment interview.

Regional Differences in the Perceptions of Recruiters

The final analysis of recruiter preference estimates focused on potential regional differences. In Table X are the results of 11 Kruskal-Wallis ANOVAs for ranked data. These significance tests analyzed the differences in preference accuracy (i.e., the 30 D^2) among the regions. The results of this analysis indicated only two significant differences in accuracy between the regions. For the benefit of pension, recruiters from the Southeast were significantly more accurate than were recruiters in the Northeast and Midwest. Nevertheless, recruiters from each of the regions significantly underestimated this benefit preference in comparison to how the students rated it.

For the benefit four day week, the southeastern recruiters were again more accurate than recruiters from the other regions.

Overall, recruiters from the three geographical regions had very similar perceptions of students' benefit preferences. And, as previously discussed, students from the three regions also exhibited very similar benefit preferences. These results may suggest that employee benefits evoke rather homogenous responses from different geographical locations. The implications of this finding are that benefit systems can be designed with the confidence that they will appeal to employees from different parts of the country and that the recruiter can be orientated and training programs can be designed to improve individual awareness of the benefit preferences of college graduates regardless of the recruiters' geographical assignments.

Summary

In summary, certainly more research should be directed at how recruiters form their opinions about the preferences of college graduates. Research questions could be focused on areas such as (1) the knowledge that recruiters have about benefit plans, (2) how recruiters are selected and trained and (3) how the interview process affects the exchange of relevant information about benefit plans and benefit preferences.

Bibliography

Breaugh, J. A. "Relationships Between Recruiting Sources and Employee Performance, Absenteeism and Work Attitudes." *Academy of Management Journal* 24 (1981): 142-147.

Brosnan, P. "The Ability to Predict Workers' Preferences: Further Evidence." *Human Relations* 28 (1976): 519-541.

Table X

DIFFERENCES AMONG REGIONS IN RECRUITER PREFERENCE ESTIMATES AND IN ACCURACY

Preference Options	Students	Recruiters			Significance of Differences
		Southeast	Northeast	Midwest	
Cost of living	13.82	13.53	14.34	11.58	n.s.
Early retirement	5.91	5.85	4.06	2.62	n.s.
Starting salary	12.25	18.30	19.42	20.68	n.s.
Days off	9.37	7.75	8.11	5.25	n.s.
Pension	10.32	5.74	4.34	4.03	*
Four day week	6.60	7.39	10.26	9.17	*
Medical-life	14.66	11.89	12.14	13.05	n.s.
Flexible time	10.36	8.47	11.89	12.14	n.s.
Stock options	10.03	7.95	9.57	10.20	n.s.
Leave of absence	7.61	6.19	5.88	4.42	n.s.
Vacation	10.63	10.32	10.03	10.72	n.s.

Note: * = .05 probability level.

Broverman, D. M. "Normative and Ipsative Measurement in Psychology." *Psychological Review* 69 (1962): 295-305.

Cattell, R. B. "Psychological Measurement: Ipsative, Normative and Interactive." *Psychological Review* 51 (1944): 292-303.

Clemens, W. V. "An Analytic and Empirical Examination of Some Properties of Ipsative Measures." *Psychometric Monographs* 14 (1966): 1-56.

Davis, K. R. Jr.; Giles, W. F.; and Feild, H. S. Jr. "What College Graduates Want in a Compensation Package." *Compensation and Benefits Review* 17 (1985): 42-53.

_____. "Recruiter Assessments of Job Applicants' Preferences: How Accurate Are They?" *Vocational Guidance Quarterly* 33 (1985): 315-323.

_____. "Compensation and Fringe Benefits: How Recruiters View New College Graduates' Preferences." *Personnel Administrator* 30 (1985): 43-50.

Dunnette, M.; Arvey, R. D.; and Banas, P. A. "Why Do They Leave?" *Personnel* 50 (1973): 25-39.

Goddard, R. W. "How to Reward the '80s Employee." *Management World* 15 (1986): 14-17.

Harlan, A.; Kerr, J.; and Kerr, S. "Preference for Motivator and Hygiene Factors in a Hypothetical Interview Situation, Further Findings and Some Implications for the Employment Interview." *Personnel Psychology* 30 (1977): 557-666.

Hicks, L. E. "Some Properties of Ipsative, Normative and Forced-Choice Normative Measures." *Psychological Bulletin* 74 (1970): 167-184.

Huseman, R. C.; Hatfield, J. D.; and Robinson, R. B. "The MBA and Fringe Benefits." *Personnel Administrator* 23 (1978): 56-60.

Johnson, A. C., and Prieve, E. A. "Changing Perspectives of College Students Toward Salary Offers." *Personnel Journal* 54 (1975): 156-161.

Lewellen, W. G., and Lanser, H. P. "Executive Pay Preferences." *Harvard Business Review* 51 (1973): 115-122.

O'Reilly, C. A., and Caldwell, D. F. "The Commitment and Job Tenure of New Employees: Some Evidence of Postdecisional Justification." *Administrative Science Quarterly* 26 (1981): 597-616.

Posner, B. Z. "Comparing Recruiter, Student and Faculty Perceptions of Important Applicant and Job Characteristics." *Personnel Psychology* 34 (1981): 329-339.

Powell, G. N. "Effects of Job Attributes and Recruiting Practices on Applicant Decisions: A Comparison." *Personnel Psychology* 37 (1984): 721-732.

Rotondi, T. Jr. "Employee Services: A Student Perspective." *Industrial Management* 19 (1977): 17-20.

Schuster, J. R. "Another Look at Compensation Preferences." *Industrial Management* 10 (1969): 1-15.

Wanous, J. P. "Organizational Entry: Newcomers Moving From Outside to Inside." *Psychological Bulletin* 84 (1977): 601-618.

Wilson, M.; Northcraft, G. B.; and Neale, M. A. "The Perceived Value of Fringe Benefits." *Personnel Psychology* 38 (1985): 309-319.

Organizational Choice: The Role of Job Characteristics

by Jill M. Pergande

Executive Summary

The design of an effective organizational strategy for recruitment must integrate organizational characteristics with the needs of job applicants. Before a recruiter can design an appealing offer of employment, the applicant's process of making a decision must be understood. Specifically, recruiters must understand what leads individuals to choose their organization's offer of employment instead of another company's offer. The purpose of this study was to investigate what objective characteristics of a position influence an applicant's choice of an organization.

Graduating seniors completed surveys designed to assess the importance of 15 objective factors such as adequate benefits, geographical location and salary. Participants in the study also rated the importance of 11 different benefits and which of three forms of a specific benefit they would most desire.

General conclusions resulting from this study are as follows:

- Opportunities for advancement, attitude of management toward its employees and training opportunities for the applicant were rated most important among a list of 15 characteristics with regard to a position.
- With regard to benefits, group health insurance was clearly the most important benefit on the list. Pensions and dental care were also rated as being important.
- Differences in ratings of the importance of benefits may also reflect differences about familiarity gained through use of some benefits or a lack of knowledge about benefit options.
- When designing attractive benefit packages, organizations should be aware that graduating students preferred traditional group health insurance and matching contributory pension plans.

Future research extending the current study is discussed.

Introduction

Personnel recruitment practices affect an organization's ability to survive as recruitment plays an important role in gathering the talent needed to capitalize on opportunities presented to the firm (Bergmann and Taylor, 1984). Without qualified employees to perform the activities necessary for the production of goods or provision of services, an organization cannot meet the performance standards necessary for its success.

Because of the importance of recruitment, organizations often conduct extensive programs to recruit new employees. Therefore, attracting capable employees can be expensive for the organization. Recent estimates of recruitment costs are as high as $1,500 to $6,000 per college graduate hired (Bergmann and Taylor, 1984). For an organization that does not have a staff to do recruiting, recruitment also requires current employees to be out of their offices, preventing them from completing their normal job duties. As a result, organizations are often forced to curtail their recruitment activities because of the associated high financial costs and lost productivity.

Given this dilemma, organizations must devise recruiting programs that wisely use their recruitment dollars. The need for qualified applicants

forces the firm to determine where and how the most qualified applicants can be found. Toward this end, it becomes important for companies to determine what makes an employment offer attractive. To ensure that top recruits will accept their offers, organizations must understand why applicants choose to work for one employer rather than another.

An important source for recruiting entry level personnel for managerial and professional positions is the college campus. College recruiting programs account for more than 50% of the college-educated talent hired each year, and placement centers represent an efficient way for recruiters and applicants to meet to discuss employment prospects (Bergmann and Taylor, 1984).

Throughout the interview process, applicants have a perception of what they think recruiters are looking for in a qualified applicant (Harlan, Kerr and Kerr, 1977). The recruiter, however, is not usually so well informed. Often, recruiters do not know what applicants are seeking in an offer of employment (Davis, Giles and Feild, 1985; Giles and Feild, 1982). Research has yet to establish what leads applicants to choose one offer of employment over another (Jurgensen, 1978).

The Objective Approach to Choosing a Position

The objective factor theory is a common approach used to explain why applicants choose a specific offer of employment (Behling, Labovitz and Gainer, 1968). Objective approaches to choosing a position propose that applicants determine what objectively measurable factors they are seeking in an employment offer. Typical objective factors are benefits, salary and geographical location. Individuals select the position that is most advantageous in terms of the objective characteristics of the job they desire.

Applications of this approach illustrate its potency in explaining selection of a position. For example, Vroom (1966) found that the attractiveness of an organization to applicants was directly related to the extent to which working for that organization was believed to lead to the attainment of their job goals. Additionally, Feldman and Arnold (1978) conducted a study in which organizational and position objective factors varied. Their results indicated that pay and fringe benefits were the most important factors in selecting a position.

If this approach can indeed be used to explain why applicants choose to accept a particular offer of employment, then it is important to determine which objective factors influence decisions about acceptance. Although some research has indicated that cost-of-living allowances and medical insurance were ranked highest among a list of objective factors (Davis, Giles and Feild, 1985), further investigation is needed to enable organizations to assemble employment offers that will attract qualified applicants.

The Present Research Project

The purpose of this project was to explore the objective determinants of how a person selected a particular organization. Specifically, this study attempted to identify the objective characteristics of the position that were important to graduating college seniors. With regard to benefits, this study investigated which benefits graduating seniors desired most. Responses in this portion of the study were also analyzed by gender to determine if preferences about benefits differed between males and females. Finally, this project explored applicants' preferences of the form of several common benefits.

Method

Participants

The participants for this study were 121 graduating seniors from Michigan State University. All of the participants were within six months of graduation. There were 60 males and 49 females (12 participants did not respond to this item). These participants represented a variety of majors, including accounting, engineering arts, finance, general business administration, history, marketing, materials and logistics management, and personnel.

Measures

A survey was designed to measure three aspects of benefits and the role they play in the participants' choice among organizations.

First, the importance of 15 objective factors was assessed by having participants rate these factors when choosing an organization where they would like to work. Two methods were used in selecting factors for inclusion. First, the literature on choice of position was reviewed to identify job and organizational characteristics that had been used in pre-

vious studies. Second, a separate group of 130 business students were asked to list those factors they would consider important in influencing their choice among organizations. These responses were cumulated, and the most frequently mentioned factors were added to those factors obtained from the review of the literature. The final list consisted of the following factors:

- Opportunity for advancement
- Adequate benefits
- Growth rate of the company
- Industry in which the company operates
- Opportunity to work in your major area of study
- Duties and responsibilities of the job
- Geographical location
- Management's attitude toward its employees
- Reputation of the company
- Salary
- Size of the company
- Personalities and abilities of other employees
- Financial stability of the company
- Training you will receive
- Flexible hours.

Participants were asked to indicate the level of importance of each factor presented using a five point scale ranging from extremely high to no importance. (See appendix for a copy of the questionnaire.)

In the second part of the survey, participants were asked to distribute 100 points among 11 benefits that organizations typically use in the process of recruitment. This list included such benefits as group health insurance, profit-sharing plans, vision care and dental care (see appendix). The benefits included on the survey were determined by reviewing published studies on benefits for typical benefit packages offered to entry level employees. Several personnel specialists in private industry and benefit research institutions were contacted to confirm the obtained benefits. Participants were asked to distribute the points to reflect their preferences in an ultimate benefit package.

Finally, participants were asked to rank their first, second and third choices among three alternative forms of the same benefit. Students were asked to rank their most desired form of group health insurance, pension plans, stock options and profit-sharing plans. The benefits included in this list were selected because they could provide needed insight about the form of benefits a potential employee would prefer (Davis, Giles and Feild, 1985).

Procedure

Participants were recruited through two sources. First, students who registered with the university placement office were asked to complete surveys as part of a larger study investigating the process of making a decision to choose a specific organization. To supplement this sample, graduating seniors who enrolled in a capstone business course also supplied information for the study.

Participants who supplied information for the larger study completed the survey upon graduation. A cover letter and survey were mailed to 20, and they were asked to respond to items on the survey and to return the completed questionnaire in a preaddressed envelope to the university placement office. Fifteen surveys were returned for a response rate of 75%. The 100 participants obtained from the business course completed the questionnaires in class.

Results

Importance of Objective Factors

In the first part of the survey, 15 factors were rated on importance when choosing an organization. The higher the rating, the more important the item. The results of this portion of the study are displayed in Figure 1. Subgroup analyses were performed to determine if differences existed between males and females in the ratings of importance of the 15 objective factors. No significant differences in subgroup ratings were found; therefore, results are reported for the entire group.

Opportunity for advancement was clearly rated as the most important characteristic with regard to position. Additionally, management's attitude toward its employees and training opportunities for the applicant were rated very important. Four objective factors emerged as highly important. These factors were adequate benefits, financial stability of the company, duties and responsibilities of the job, and salary. Six characteristics of a job were rated moderately important to participants in choosing an organization: reputation of the company, personalities and abilities of other employees, opportunity to work in the applicant's major area of study,

geographical location, growth rate of the company and the industry in which the company operates. Only two job characteristics were rated relatively unimportant: flexible hours and size of the company.

Benefits

Results of this portion of the research are displayed in Figure 2. Group health insurance clearly emerges as the most desirable of the 11 benefits investigated. Pensions and dental care are also rated highly desirable. Beyond these three benefits, the ratings do not vary greatly. The average number of points assigned to additional vacation time, group life insurance, education/tuition assistance, profit-sharing plans and flexible benefit plans only varies from 8.07 to 9.80. Those benefits receiving slightly lower ratings included stock purchase plans and vision care. Legal services emerged as rather unimportant when compared to the other ten benefits investigated.

The equivalence of ratings within benefits is confirmed by examining the amount of points most often assigned to each benefit. With the exception of group health insurance, the other benefits are rated as being almost equally desirable. Group health insurance was most frequently assigned 20 points; the remaining benefits were most often assigned ten points. Three exceptions were vision care, which received five points most frequently, and legal services and stock purchase plans, which were rated zero most often.

Rankings Within Benefits

The results of the rankings within benefits are presented in Figure 2. Participants preferred traditional group health insurance to health maintenance organizations and personal health plans. They preferred matching contributory pension plans to contributory pension plans and non-contributory pension plans. Employer-employee matching fund stock purchase plans were preferred to discounted stock purchase plans and receiving stock as part of the compensation package. Finally, cash plan and combination plan profit sharing were preferred over deferred plan profit sharing.

Conclusions

Several conclusions can be formed based on the results of this project. First, the findings of this study indicate that, in general, job applicants place high importance on advancement opportunities, the attitudes of management toward employees and the training opportunities available to new hires. Also important to potential employees are adequate benefits, the financial stability of the company, the duties and responsibilities of the job, and salary. Companies interested in hiring the most qualified college recruits for entry level positions should design jobs with these results in mind. Applicants should be trained so that they have the talent needed to advance within the company.

Organizations can also benefit from selling these strong points to typical sources of information used by recruits. College students have access to placement service libraries, professors and friends that already work for an organization (Fisher, Ilgen and Hoyer, 1979). Companies should make certain that these sources are well supplied with favorable information especially if they are strong in areas rated as important in influencing organization choice.

Secondly, the results of this study indicate that within benefits, job applicants have a clear preference for group health insurance. Average ratings indicate that pensions and dental care are desirable. Additional vacation time, group life insurance, education/tuition assistance, profit-sharing plans and flexible benefit plans emerged as being equally desirable to participants. Stock purchase plans, vision care and legal services were rated the least desirable among the 11 benefits investigated.

It should be noted that the results from the present study may reflect a lack of information that college students have about benefits. Future studies should determine how familiar job applicants are with the different benefits that organizations typically offer. Until recruiters are able to determine the extent of knowledge college applicants have about different benefits, they cannot develop successful recruiting programs (Davis, Giles and Feild, 1985).

Second, the findings may reflect actual use of the investigated benefits. The benefits having the highest average points represent benefit options students have probably used. Health plans date as far back as 1798, and by 1983 approximately 75% of all workers in the United States were covered by an employer-sponsored health insurance plan (Employee Benefit Research Institute (EBRI), 1983). Given their popularity and growing importance, applicants are apt to be well aware of the rising cost

of health insurance. It is not unreasonable to assume that most applicants are covered by their parents' health plans or that they have purchased some form of health insurance. Consequently, participants are more familiar with health care because they have probably filed health insurance claims under their parents' or their own health plans.

The high desirability of pensions can be explained by familiarity with the benefit. Recently, media attention has focused on many forms of retirement plans. Banks aggressively advertise individual retirement accounts and the tax breaks associated with them. Additionally, the Employee Retirement Income Security Act is the most comprehensive employee benefits legislation ever enacted in the United States; and by 1979, 55 million people were covered by private pension and deferred profit-sharing plans (EBRI, 1983). Because of increased media attention and heavy federal regulation, participants are very familiar with this benefit.

The low ratings of vision care, legal services and stock purchase plans may reflect limited use of these benefits. Although health insurance plans often provide limited vision care, the need for vision care often does not become pronounced until age 40. Hence, college students may not have had an occasion to use vision care services extensively.

Similarly, it is doubtful that many college students have had much experience in legal situations. According to an American Bar Association survey, 80% of the public are uncertain about how to even obtain legal advice. Consequently, legal services received a low rating as a desirable benefit.

Finally, unlike group health insurance and pensions, stock purchase plans do not have a long history of federal regulation. Although stock purchase plans are gaining in popularity, the typical college student has not made frequent decisions about investments. In addition, stock options are becoming more and more complex as tax laws change. The ratings of this study may represent students' lack of familiarity with investments of this form in general or lack of familiarity with the implications of stock purchase plans.

Lastly, based on the results of the final portion of this study, organizational recruiters should take note of the form of health insurance, pension plans, profit-sharing plans and stock purchase plans that potential employees prefer. Given the ratings these benefits received in the previous part of the study, recruiters should concentrate their efforts on the most favorable form of group health insurance and pensions. If the company does not offer the most preferred form of a given benefit, the recruiter should emphasize the advantages of the form of the benefit that they do offer.

It should be kept in mind that what the students know or did not know about each form of benefit included in this study was not assessed. Therefore, results should be interpreted with caution since it is impossible to tell if benefit ratings stem from well-informed assessments of desirability or from ignorance of benefit options.

Future Research

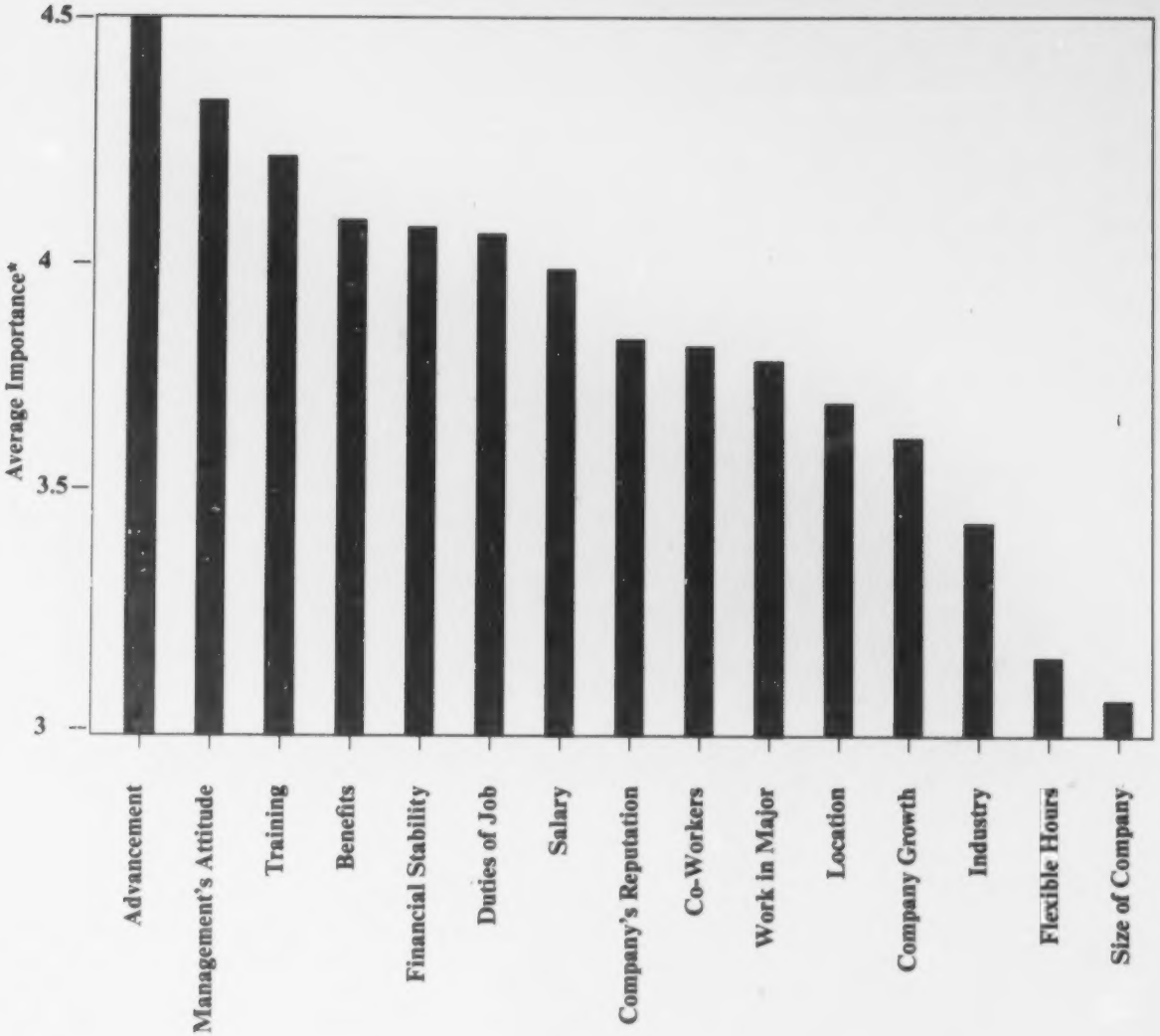
In order to be most useful, future research should address the applicants' entire process of making decisions. Additional approaches to organizational choice should be explored. For instance, perspectives other than the objective factor theory should be examined in explaining why job applicants choose an offer of employment. The author is currently conducting research that better investigates the entire process of how people make decisions. Additional approaches to organizational choice are being examined to develop a body of theory to explain why a specific position is chosen.

Secondly, the role of benefits in organizational choice must be further explored. The results of this study should be confirmed using additional samples. Practitioners, recruiters and benefit specialists need information regarding the importance of benefits in the overall decision of choosing an organization. Within benefits, it would be useful to know which specific benefits are important and if reliable differences exist between the various groups from which the company recruits.

Finally, before conclusions can be drawn from information supplied by college students, their knowledge of the benefits that organizations offer and the various forms those benefits may take must be determined. If graduates base their evaluations on inaccurate information, recruiters must first educate job applicants before the recruiters can expect the applicants to supply valid information regarding preferences with regard to job characteristics. Once job applicants are familiar with benefit options, they can supply accurate information to indicate how the decision process occurs and exactly what role benefits play.

Figure 1

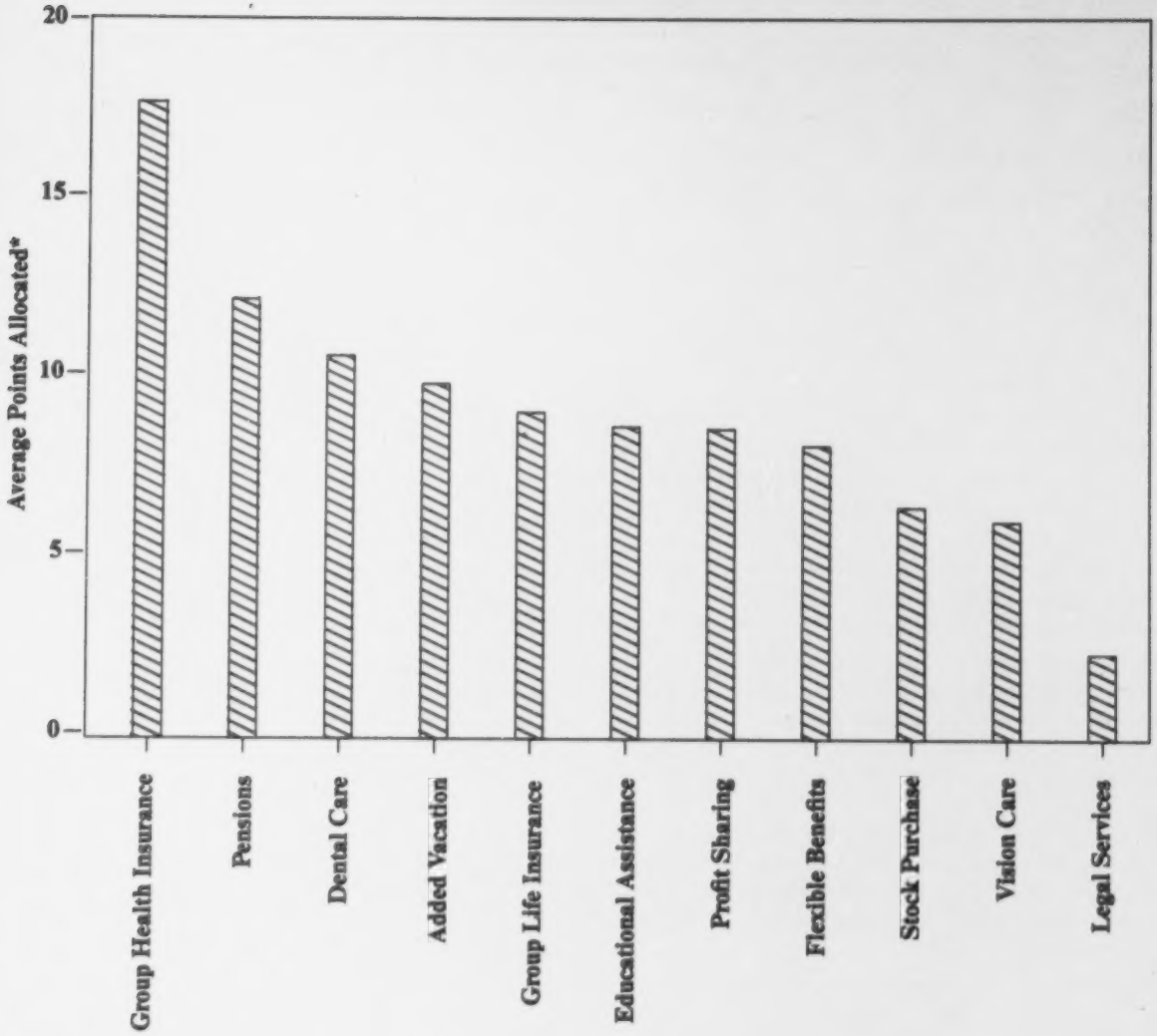
RATINGS OF OBJECTIVE JOB FACTORS



*Scale ranged from 1 = no importance to 5 = extremely important.

Figure 2

AVERAGE RATING OF BENEFITS



*100 points allocated to reflect the level of importance.

Appendix

MICHIGAN STATE UNIVERSITY
Placement Services
East Lansing, MI 48824
Benefits Research Project

Name _____ Major _____

Sex ____ Male ____ Female

DIRECTIONS: Please rate the importance of the following factors when choosing an organization where you would like to work.

	Levels of Importance				
	Extremely High	High	Medium	Low	No
1. Opportunity for advancement	1	2	3	4	5
2. Adequate benefits	1	2	3	4	5
3. Growth rate of the company	1	2	3	4	5
4. The industry in which the company operates	1	2	3	4	5
5. Opportunity to work in your major area of study	1	2	3	4	5
6. The duties and responsibilities of the job	1	2	3	4	5
7. Geographical location	1	2	3	4	5
8. Management's attitude toward its employees	1	2	3	4	5
9. Reputation of the company	1	2	3	4	5
10. Salary	1	2	3	4	5
11. Size of the company	1	2	3	4	5
12. Personalities and abilities of other employees	1	2	3	4	5
13. Financial stability of the company	1	2	3	4	5
14. Training you will receive	1	2	3	4	5
15. Flexible hours	1	2	3	4	5

DIRECTIONS: Please read the benefit options listed below. Among these options, distribute 100 points to indicate the mixture you most desire in an ultimate benefit package. Do not worry about the actual dollar value of each benefit. Do not assign points to a benefit if it is of no importance. Base your point assignment on the importance of the benefit to you. The more points you assign to an option, the greater your preference for the option. Remember, the points you assign should total 100.

_____ Additional vacation time
_____ Dental care
_____ Education/tuition assistance
_____ Flexible benefit plans
_____ Group health insurance
_____ Group life insurance
_____ Legal services
_____ Pensions
_____ Profit-sharing plans
_____ Stock purchase plans
_____ Vision care
100 Total points

DIRECTIONS: Please rank the importance of the following benefits within each group. Do not worry about the actual dollar value of each benefit. Your ranking within each group should reflect the desirability of the benefit compared to the other two benefits listed in that group. Rank them using the following ratings:

1 = Most desirable benefit (in the group of three)
2 = Next most desirable benefit
3 = Least desirable benefit

_____ *Traditional Group Health Insurance:* Participating doctors and hospitals agree to accept a predetermined specified fee as payment in full for each service received by a member of the insured group.

_____ *Health Maintenance Organizations:* Organizations of physicians and other health care professionals provide health services to subscribers and their dependents on a prepaid basis.

_____ *Personal Health Plan:* Individuals purchase health insurance coverage on their own, independent of their employing organization.

_____ *Contributory Pension Plan:* Employers make payments into the employee's pension fund. Assume that vesting occurs after ten years.

_____ *Noncontributory Pension Plan:* Employees make tax deductible payments into their own pension fund. Assume immediate vesting.

_____ *Matching Contributory Pension Plan:* Employers and employees contribute specified percentages into the employee's pension fund. Assume that the employer's payment is vested at 10% per year.

_____ *Discounted Stock Purchase Plan:* Employees are given the opportunity to purchase company stock at discounted prices.

_____ *Employer-Employee Matching Fund Stock Purchase Plan:* Employers match employees dollar for dollar in the purchase of company stock.

_____ *Receive Stock as Part of Compensation Package:* Employee receives stock in the company as a portion of the compensation received for his or her work.

_____ *Cash Plan Profit Sharing:* At the time profits are determined, benefits are paid directly to employees in the form of cash, checks or stocks.

_____ *Deferred Plan Profit Sharing:* Benefits are credited to employee accounts and paid at retirement or at the time of other specified events.

_____ *Combination Plan Profit Sharing:* A portion of the benefit is paid in cash, and another portion is placed in an account until the employee's retirement or other specified event.

SELECTED BIBLIOGRAPHY

Behling, O.; Labovitz, G.; and Gainer, M. "College Recruiting: A Theoretical Base." *Personnel Journal* 47 (1968): 13-19.

Bergmann, T., and Taylor, M. S. "College Recruitment: What Attracts Students to Organizations?" *Personnel* 61, no. 3 (1984): 34-36.

Davis, W. R.; Giles, W. F.; and Feild H. S. "What College Graduates Want in a Compensation Package." *Compensation and Benefits Review* 17 (1985): 42-53.

Employee Benefit Research Institute. *Fundamentals of Employee Benefit Programs.* Washington, D.C.: EBRI, 1983.

Feldman, D. C., and Arnold, H. J. "Position Choice: Comparing the Importance of Organizational and Job Factors." *Journal of Applied Psychology* 63 (1978): 706-710.

Fisher, C. D.; Ilgen, D. R.; and Hoyer, W. D. "Source Credibility, Information Favorability and Job Offer Acceptance." *Academy of Management Journal* 22 (1979): 94-103.

Giles, W. F., and Feild, H. S. "Accuracy of Interviewers' Perceptions of the Importance of Intrinsic and Extrinsic Job Characteristics to Male and Female Applicants." *Academy of Management Journal* 25 (1982): 148-157.

Harlan, A.; Kerr, J.; and Kerr, S. "Preference for Motivator and Hygiene Factors in a Hypothetical Interview Situation: Further Findings and Some Implications for the Employment Interview." *Personnel Psychology* 30 (1977): 557-566.

Jurgensen, C. E. "Job Preferences (What Makes a Job Good or Bad?)." *Journal of Applied Psychology* 63 (1978): 267-276.

Vroom, V. R. "Organizational Choice: A Study of Pre- and Postdecision Processes." *Organizational Behavior and Human Performance* 1 (1966): 212-225.

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RESEARCH REPORT

Pension Splitting in Canada

Phelim P. Boyle and Saloon Tham

May 1989 ***Grants for Research*** ***Report 89-1***

Pension Splitting in Canada

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May 1989 • Report 89-1

International Foundation
OF EMPLOYEE BENEFIT PLANS
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About This Report

The International Foundation's Grants for Research program was established to encourage graduate students and professional researchers to pursue the study of problems having legal, economic, social or political consequences for the private employee benefits field.

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Saloon Tham of the department of statistics and actuarial science at the University of Waterloo served as research assistant on this study.

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Abstract

The purpose of this study is to examine certain aspects of the valuation of pension credits upon marriage dissolution in Canada. Specifically, the report investigates the sensitivity of the valuation results to variations in provincial jurisdiction and legal interpretations as well as to variations in technical actuarial assumptions and valuation methods. A Canada-wide survey of practicing actuaries was used to gather information on current practice and problems in this area. A hypothetical case was used to test the sensitivity of the valuation results to different economic and actuarial assumptions as well as to different actuarial valuation methods.

1. Introduction and Background

In recent years there has been an increasing trend in Canada to regard pension benefits as family assets in the event of marriage breakdown. For example, British Columbia introduced such provisions in 1978 and Ontario in 1986. Since pension benefits normally consist of an entitlement to a future stream of payments whose ultimate level, date of inception and duration depend on a host of contingencies, it is not surprising that it is difficult to place a value on these benefits. Furthermore, pension plans are often viewed as complicated arrangements with their own specialized and poorly understood jargon. Legislators have had a difficult task in framing legislation that is equitable and simple to administer. The courts have struggled to interpret the legislation in this complex area.

In different provinces, the problem of pension valuation in these circumstances has been resolved in different ways. In British Columbia the approach used differs considerably from that currently advocated in Ontario.[1] Currently, this is an area of evolving practice as the courts struggle with the variety of issues involved.

In many cases, the courts use actuarial evidence to provide expert assistance in the valuation of pension credits upon marriage breakdown. In Canada, the Canadian Institute of Actuaries (CIA) has set up a task force to study the issues involved and has made proposals aimed at producing consistent valuation results, at least within different provincial jurisdictions.

The present paper, which forms part of a larger study, examines certain aspects of this problem. In particular, we examine the variations in methodology and assumptions currently used by actuaries in Canada. This information was obtained from a survey of Canadian actuaries practicing in this field. To measure the sensitivity of the valuation result to the different assumptions and methods, we used a hypothetical pension plan and an assumed fact situation.

The organization of the paper is as follows. In Section 2 we provide a general introduction to pension plans in Canada. Section 3 discusses the problems of the valuation of pension credits and highlights some of the issues. Section 4 provides the background to the survey, while Section 5 gives a detailed summary of the responses. In Section 6 we summarize the sample valuation reports that were based on a hypothetical pension plan and an assumed fact situation. Section 7 deals with the sensitivity of the valuation result to different assumptions and methods. Finally, Section 8 provides a summary of the paper.

2. Pension Plans

This section provides an introduction to pension plans and describes some of their salient characteristics. A pension plan is an arrangement whereby a group of individuals such as a group of employees is provided with retirement and often other benefits. Often the plan is initially set up by an employer, the plan sponsor. The basic idea is that contributions are made to a fund while the plan members are working. These contributions are invested in securities such as common stocks and bonds to provide the funds required when the members retire. Pension plans in Canada receive tax concessions and are subject to both federal and provincial regulations.

Pension plans can be analyzed according to the way in which the plan benefits are computed. In particular, there are two common ways of computing the benefit at retirement. These two types of plans are known as defined contribution plans and defined benefit plans. Under a defined contribution plan, the pension benefit available to a plan member at retirement depends on the amount of money contributed in respect of that individual and the investment performance of the fund. Essentially, the contributions in respect of each plan member can be viewed as being placed in a separate "pot." The amount in the pot when the member retires will depend on how the investments of the fund, or the plan assets, have performed over the duration of the individual's active membership in the pension plan. Note that in this case the individual plan member is exposed to investment risk. If the investments perform well, the individual's benefit is correspondingly increased. The reverse is true if the investment performance is poor.

On the other hand, the benefit payable under a defined benefit plan is predetermined according to some specific rules. For example, it might be computed with reference to the salary of the plan member at time of retirement or during the few years preceding retirement. If the benefit formula provided a benefit of 2% of the final salary for each year of service, a member with 20 years of service and a salary at retirement of $80,000 would be entitled to an initial annual pension of $32,000. This is computed as follows:

$$20 \text{ x. } 02 \text{ x } \$80{,}000 = \$32{,}000$$

In the case of a defined benefit plan, the benefits could also be related to the member's average salary over some prearranged period. Alternatively, the defined benefit formula could be based on a fixed dollar amount for each year of service. In defined benefit plans, it is normal for the formula to provide a pension benefit that is proportional to the number of years of the member's service in the plan. It is commonly accepted that, other things being equal, the longer the individual's membership in the plan the larger should be his or her benefits from the plan. Note that under a defined benefit plan the plan sponsor guarantees the benefits. It is, therefore, the plan sponsor that assumes the investment risk and not the individual plan member.

In both types of plans, the pension benefit at retirement consists of a stream of payments that continue as long as the retired member survives. Sometimes the pension payments continue (perhaps at a lower level) for the remaining lifetime of the nonmember spouse if the member spouse dies first.

In addition to the retirement benefits, pension plans often provide benefits that depend upon other contingencies such as the member's termination from the plan, the member's death while still in service or disability. Pension plans provide a variety of benefits in these circumstances, depending on the rules of the particular plan.

In the context of marriage breakdown, the problem of pension valuation is most acute in the case of a defined benefit plan (where the benefit is based on the member's ultimate final average salary) when the breakdown occurs while the member is an active plan member. Most of the technical valuation problems occur in these situations. The underlying reason is that in this case the value of the member's pension depends on events that have not yet occurred. Hence, assumptions must be made as to the likelihood of such events. Furthermore, there are different methods that can be used to compute the current value of the pension benefits. This serves to further complicate the issue. We address some of these points in the next section.

3. Valuation Issues

In this section we examine some of the valuation issues that arise in the context of pension splitting upon marriage breakdown. We restrict our attention for the most part to a defined benefit pension plan where the benefit is based on the plan member's average salary during a few years before retirement. In this case, the pension benefit at retirement consists of a stream of payments of uncertain size and duration.

Within the domain of financial economics, there are several examples of financial instruments involving a sequence of future payments. Sometimes the magnitude and the duration of these payment streams are uncertain. However, in the case when these instruments are traded securities, one can quickly determine their market value. This is the consensus value placed on the future payment stream by market participants. We can readily determine the price of a long term Canadian Government bond or a share of Canadian Pacific common stock, since these are traded on a daily basis. At any time, the market provides a unique objective value of such securities.

In the case of pension benefits, there is no organized secondary market, and the valuation of such benefits becomes more subjective. It is still possible to use some of the information implicit in the market values of the traded financial instruments to provide assistance in the valuation of pension benefits.

It should be noted that, while it is necessary for the desired valuation method to produce results that are objective, this is by no means sufficient. Some approaches that are eminently objective do not give answers that are economically sensible. For example, the accumulated amount of a plan member's contributions to the pension plan is usually quite well determined. It would normally be quite inappropriate in the context of a final average salary pension plan to equate this amount with the value of the plan member's interest in the plan. This is because the benefit is computed with respect to his or her future salary averaged over the years preceding retirement. By analogy, if an investor purchased 100 shares of Canadian Pacific at $15 a share one year ago and if today the shares trade at $30 each, the current value of that portfolio is $3,000 and not $1,500.

It should be stressed that the value of the pension benefits can be profoundly affected by the valuation method that is implicit in the provincial legal regulations and their subsequent interpretation in leading cases. These regulations often strive for simplicity and objectivity — both desirable attributes. However, they can sometimes be criticized on the grounds of economic realism. For example, the Ontario regulations have tended to equate the value of the member's pension benefit with the benefit available, assuming that the member just terminated employment. Since the termination benefit is often based upon salary at termination, whereas the pension benefit will be based upon the member's final salary (computed during the years preceding retirement), the termination method provides a value that many observers consider to be too low. In this case, the nonmember spouse tends to be disadvantaged relative to the member spouse.

While there are many different methods used to compute value of pension benefits in these cases, it is helpful to distinguish three of the main ones that are used in this type of work:

1. The retirement (or projection) approach. This is the approach commonly used in British Columbia.

2. The termination method. There are are at least three versions of this method. This method is commonly used in Ontario.

3. The California approach, also known as the "if, as and when" method or the "wait and see" method. In this case, the parties split the future income payments from the pension plan.[2]

Under the retirement approach, the plan member's expected future benefit is computed. This expected future pension benefit incorporates future salary escalation at some assumed rate until the member retires. This benefit is then prorated by the ratio of the member's period of marriage to the period of total (potential) membership. This prorated benefit is then converted into an equivalent lump sum as at the valuation date. Under the termination method, the pension benefit is computed with reference to the member spouse's benefits in the plan by assuming that the member spouse had just terminated. More details of this method will be given later. The "wait and see" approach divides the future income stream, whereas the other two approaches provide a capitalized or lump sum amount for the value of the pension interest.

Even if the same valuation method is employed in two identical fact situations, the results often differ, sometimes significantly. This difference may result from the use of different economic assumptions; e.g., two different interest rates may be used to discount the future payments. The difference can also be due to different actuarial-demographic assumptions, e.g., assumed retirement at age 55 in one scenario and assumed retirement at age 63 in another. The Canadian Institute of Actuaries has recommended a standard set of valuation assumptions[3] to be used in pension valuation work of this nature. We shall see later that the adoption of these assumptions tends to reduce but not eliminate such differences.

This is because there are still choices left open that can affect the result and because the same set of assumptions can be interpreted differently. Later on in this paper we probe some of these differences and discuss the sensitivity of the valuation results to the choice of valuation methods and choice of assumptions. We do this in two ways. First, we compare the results obtained by different actuaries in our survey for the same fact situation. Second, we value the same pension benefits ourselves and prepare tables illustrating the sensitivity of the results to changes in the valuation methods and to variations in the assumptions.

Once the value of the divisible pension assets has been established, the mechanism by which the assets are to be divided has to be decided. There are several different types of settlement options available depending on the jurisdiction and the terms of the pension plan. In this paper we do not discuss the detailed settlement options that are available, since our primary focus is on valuation.

The division of pension assets on marriage breakdown gives rise to a whole host of complex issues. Currently this work is carried out in a dynamic environment where legal precedents are evolving, and a variety of technical and practical issues are still largely unresolved. Our survey instrument was designed to capture current thinking among actuarial practitioners on some of these issues.

4. The Survey

We conducted a Canada-wide survey on the division of pension credits upon marriage breakdown. Questionnaires were distributed in January 1988, and most of the replies were received before the end of February 1988.

The questionnaire contained 15 questions ranging from technical valuation problems to more general issues. It was pretested on a few actuaries knowledgeable in the pension area and suitably modified.[4] The survey was designed so that these questions could be answered quickly (in under 30 minutes). We provided space for the respondents to make comments and these comments, often in point form, provide helpful insights concerning several issues in this area. In addition to the questions, we also included a hypothetical fact situation involving a generic pension plan — the BN pension plan. The fact situation related to a mythical couple — Harold and Anna. We requested respondents to prepare a sample valuation report that they might use in this situation and indicated that the preparation and inclusion of such a report was optional. Given the work involved, we did not wish to make the inclusion of such a valuation report a mandatory component of the exercise. The complete details of the survey instrument are given in Appendix I.

The survey was sent to a sample of actuaries across Canada who were thought to be involved in this type of work. Where we had no information, we used a random sample of actuaries from actuarial consulting firms. Sometimes the same firm was surveyed more than once. In many cases, the individuals contacted would pass the questionnaire on to the consultant who specialized in this line of work. Ideally, we would have liked to have had access to a database of names of individual actuaries doing valuation work in this area, broken down by province and volume of work.

The questions in the survey were designed as follows: Questions 1 and 2 were aimed at eliciting information on the provincial distribution of the sample and the volume of business carried out. Question 3 was designed to see if the actuaries surveyed usually represented the member spouse or the nonmember spouse. Question 4 examined the choice of valuation method, while question 5 concerned the choice of valuation bases. Question 6 examined the choice of retirement date, while question 7 discussed the mortality assumptions. Questions 8 and 9 discussed the valuation of death benefits. Question 10 related to the treatment of different levels of pension indexation. Questions 11 and 12 related to technical and actuarial problems, while question 13 inquired about problems arising from the legal environment. Question 14 asked about other problems, and question 15 provided an opportunity for respondents to provide more general comments on the various issues.

The questionnaire was mailed out in January 1988 to 103 actuaries. Twenty-eight replied to the survey, but only 20 answered the questionnaires. Four completed sample valuation reports were received. The distribution of these questionnaires with respect to the geographical locations and the percentage of respondents are presented in Table 1. None of the responses from Quebec included a completed questionnaire because "it is not usual in the province of Quebec to look at the division of pension assets upon marriage breakdown."[5]

5. Summary of Results of Survey

In this section we present a summary of the responses to the questionnaires. We have included a fair amount of detail in some cases because these details may be of interest. The summary is organized according to the sequence of questions. We provide our own comments on the results in parentheses after summarizing the responses to each question.

Question 1

The question is: In what province is most of your work on the valuation and division of pension benefits carried out? The responses are summarized in Table 2. (Note: One respondent gave four provinces in answer to this question.)

(Comment: There is a large proportion of Ontario responses in the overall sample of respondents. Almost 50% of the respondents were from Ontario. This should be kept in mind when interpreting the results.)

Question 2

The question is: On average, how many pension valuations related to marriage breakdown do you conduct per annum? The responses are summarized in Table 3.

(Comment: Our sample of respondents tended to be specialists in this area and so they are likely to be well informed about current practice and recent developments.)

Question 3

The question is: What percentage (approximately) of these do you provide actuarial advice for — member, nonmember, both parties together through one agreed-upon report? Out of the 20 responses, both the weighted and unweighted average proportion of representation is calculated and summarized in Table 4. (Note: Weighted average is calculated using the results of question 2; i.e., more weight is given to responses with higher number of valuations.)

(Comment: Table 4 indicates that the group of actuaries represented in our sample provide advice to both member and nonmember spouses with about the same frequency. It is also of interest to see whether individual actuaries tend to provide advice to both member and nonmember spouses with equal frequency. In general, this appears to be the case, but in our sample there were four respondents who provided at least 30 reports per annum and who represented the nonmember spouse twice as often as they represented the member spouse. We have no information about why this is the case.)

Question 4

The question is: What method (methods) do you currently employ to compute the value of the pension benefit?

(i) The termination approach
(ii) The retirement or projected approach
(iii) The "wait and see" or "if, as and when" approach
(iv) Other approaches — please explain.
(v) Method depends on circumstances — please explain.
(vi) More than one approach — please explain.

The responses are summarized in Table 5. Since most of the respondents gave more than one answer, the number in column 2 of the table represents the percentage of respondents who gave a particular choice as their answers or as part of their answers.

Comments to this question were as follows.

1. One respondent selected (i), "with projection of service for eligibility to benefits."
2. Would use retirement method if requested.
3. Use (ii) before April '86, then gave both (i) and (ii), now (January '88) only give (i).
4. One respondent selected (vi) — "depends on situations, lawyer's instructions and questions."
5. "95% of the time use (i), occasionally use (ii) if requested. Natural bias in Alberta to the termination approach."
6. Used (ii) when retained by nonmember spouse. Fundamental actuarial principles that require that the calculation be based on a projection of future events imply the use of (ii) if it is likely that the employee will remain until retirement. However,the law in B.C. seems to state otherwise.
7. Selected (iv). Modification of termination method, applicable to nonvested benefits, including "early retirement benefits." The "contribution method" (accumulated employee contribution) is always used as a minimum value.
8. "For CFSA (Canadian Forces Superannuation Account) and RCMPSA (Royal Canadian Mounted Police Superannuation Account) use termination method (modified) as second calculation to assume member continues to some age — say 55, since they have generous (no reduction) benefits on release, i.e., RCMP (Royal Canadian Mounted Police) with 24 years, one day service and armed forces 20 years service, etc."
9. One respondent selected (v) with this comment — "Usual approach is to calculate value of the deferred vested benefits as if plan member terminated employment on the applicable date. This means there would be no allowance for salary projection in a final average salary."
10. One respondent selected (vi) with this comment — "We show changes in value under certain scenarios that are inconsistent with the 'true' termination method."
11. Use any approach desired if requested.

(Comment: The termination approach appears to be the most popular. However, recall that half of our respondents were from Ontario, so this tends to favor the termination method. The comments of the respondents are interesting. There is some evidence that actuaries are responsive to suggestions from lawyers — comments 2, 4, 5 and 11. Comment 6 indicates that there is at least some tendency to provide a result that will favor the client being represented.)

Question 5

The question is: What actuarial assumptions do you normally employ in these computations?

The first choice under this question was the Canadian Institute of Actuaries (minimum) valuation bases for transfer values.[6] More than half of the respondents indicated they employed these assumptions and added the following comments:

1. When requested by the lawyer to do so
2. Minimum basis is not helpful in selecting pension commencement date.
3. Pending the development of specific CIA (Canadian Institute of Actuaries) recommendations
4. When the CIA assumptions are not appropriate: (a) when there is a competitive market for annuities; (b) in order to aid the understanding of parties it is often helpful to round interest rates and keep step rates to one step. The simplified assumptions would typically give equivalent results.
5. Saskatchewan tables — minimum values
6. Interest only, including escalated plans.

Those with NO as answers for this choice gave the following comments:

1. Whatever basis the employer uses for determining termination commuted values — usually CIA basis.
2. Approximately the same as CIA, sometimes asked to use Marsham assumptions, i.e., 2.5% Canadian Life Table but clearly state that these are not what I would use.
3. Where benefits are fully indexed during the deferral period and after retirement, would normally use a net rate rather than a gross interest rate with separate allowance for inflation.
4. Will likely move to CIA recommendation basis when this is ultimately finalized.
5. Two and a half percent level for fully indexed plans such as TSF (Teachers' Superannuation Fund), PSSF (Past Service Superannuation Fund); this is not in strict accordance with the CIA minimum transfer value method.

One respondent replied with both YES and NO, with this comment: Nonindexed, use approximation to CIA. Indexed, use 2-5% interest rate precedent of test law.

One respondent did not choose either one of the answers but gave the following comment: Most recent valuation basis. If PBSA (Pension Benefits Standards Act), then I look at the CIA numbers too and use the highest value. The benefit valued is in all cases the benefit accrued during the marriage without projection to normal retirement date.

The second part of question 5 asked, "If you employ alternative assumption, please outline circumstances where you would do so." See the comments above.

The third part of question 5 read, "Indicate and describe the representative assumptions you would employ concerning:

A. Mortality
B. Interest
C. Salary escalation
D. Termination rates

E. Retirement rates
F. CPP escalation
G. Other relevant assumptions: Explain."

The following is the summary of A:

1. Seventy percent used GAM83 (Group Annuity Mortality Tables 1983). (Some state that unprojected GAM83 is used.)
2. Ten percent used GAM71.
3. Ten percent used 80-82 Canadian Life Tables (sex distinct).
4. One respondent used Census Life Table plus medical opinion, etc.
5. One respondent only used GAM83 after retirement but assumed no mortality before retirement.

The following is the summary of B:

1. Forty-five percent used CIA basis.
2. One respondent used Saskatchewan Tables.
3. Twenty-one percent used interest rate between 8% and 10%.
4. Ten percent used interest rate between 2% and 3%.

Authors' note: Apparently comment 3 refers to the nominal rates and comment 4 refers to the real rates.

The following is the summary of C:

1. Sixty-two percent replied with NIL.
2. Sixteen percent used 5-6% as salary escalation.
3. One respondent used net interest rate.

The following is the summary of D:

1. Ninety-one percent gave NIL as answer.
2. One respondent used 2% p.a.
3. One respondent commented: If termination basis — immediate; if projected basis — NIL.

The following is the summary of E:

1. Forty-five percent answered NIL.
2. Forty-two percent used the earliest date at which unreduced pension available.
3. One respondent used a range of retirement dates.
4. One respondent replied: Wouldn't use range; single age per lawyer's instruction.

The following is the summary of F:

1. Sixty-one percent gave NIL as answer.
2. One respondent replied: Related to interest rate, but seldom much above 4.5%

3. One respondent replied: Same as salary escalation unless salary escalation affected by employee's prospect.
4. One respondent replied: At CPI.[7]

The following is the summary of G:

1. Seventy-four percent did not give comments to this question.
2. One respondent replied: Expenses equal 5%. (Pension to current date is based on current earning. Hence, I feel no salary projection is required. If necessary — client requests, court requires — I would base benefit on projected earning.)
3. One respondent replied: CPI — within interest, as per CIA. Inflation — 5%. Postretirement pension adjustment depends on the plan provision.
4. One respondent replied: Will approximate discount by 5-10% when close to vesting, e.g., eight year service in ten year vesting.
5. One respondent replied: Ad hoc indexing — do two calculations, (1) 0% indexation, (2) historical levels. Remarriage — parties never remarry.
6. One respondent replied: DNR maximum for highly paid employee.
7. One respondent replied: Tax-related. Tax rates and brackets will increase at same rate as earnings for purposes of determining projected tax rate at retirement.

(Comments: Parts 1 and 2 — Recall that this survey was conducted in January 1988, so the situation may have been changed since then.

3A -- Clearly the most popular mortality table is GAM83 as recommended by CIA minimum transfer value basis.

3B -- The CIA interest assumptions are the most frequently used, but there is a considerable range.

3D — Termination rates seem to be rarely employed. If the termination method is used as the valuation method, then it is assumed that termination has occurred.

3E -- The retirement date assumption has an important impact on the calculations. It would appear that many actuaries use one or more point estimates of the retirement date rather than an assumed set of retirement rates.)

Question 6

The question is: If there is a choice of retirement dates, which of the following best summarizes your approach?

(i) Use the normal retirement date.
(ii) Use a range of possible retirement dates and produce several valuations.
(iii) Use a range of retirement dates and use probabilities of retirement to compute a single number.
(iv) Use the most likely or most probable retirement date as instructed by your lawyer or the court.
(v) Use first retirement date at which employee can qualify for unreduced benefit.
(vi) Other — please explain carefully.

The responses are summarized in Table 6. Since most of the respondents selected more than one answer, the number in column 2 of the table represents the percentage of respondents who selected a particular choice as their answers or as part of their answers.

The following is the collection of comments for this question.

1. One respondent selected (i) if "inactive."
2. One respondent selected (v) "based on service to date of marital breakdown (modify this if made allowance for salary increases)."
3. Court in B.C. may favor "age when you can afford to retire" rather than "age at which you will retire."
4. Often (ii), (iv) and (v) are the same.
5. One respondent said (iv) overrules the rest.
6. One respondent gave (ii) with this comment: "Typically use (1) first unreduced age; (2) normal retirement age and (3) most probable retirement date."
7. One respondent answered this question by stating "CIA basis."

(Comment: The most frequently used retirement date assumption is (v). However, actuaries often use more than one assumption here as Table 6 indicates. As our sensitivity calculations indicate, the value of the pension benefit can be quite sensitive to the retirement date assumed, so this is a key assumption.)

Question 7

The question is: Assuming the employed spouse is a male, do you value the pension benefit to be divided using:

(i) A single male life mortality assumption
(ii) A joint life mortality assumption during active period
(iii) Unisex table
(iv) Other — please explain in detail.

Eighty percent of our respondents answered (i), 16% answered (iv), 5% answered (iii) and none responded with (ii). Those who answered with (iv) gave the following explanations:

1. Would use a joint life mortality assumption in respect of the postretirement period.
2. For many plans in Saskatchewan, a joint and survivor pension is paid to the member, even if he or she is single at retirement, as long as the member is married at death.
3. Use interest only.

(Comment: The most common choice is (i): the single male mortality assumption. This assumption has the merit of simplicity although a justification for other types of mortality assumption could be advanced.)

Question 8

The question is: In carrying out such valuations, what is your approach to the inclusion of the value of death benefits? Table 7 summarizes the responses.

The following is the collection of comments to this question.

1. Spousal death benefits NEVER included.
2. Return of contributions or guaranteed pension ALWAYS included.
3. One respondent included death benefits before retirement depending on the death benefits in plan.
4. Generally exclude both (before and after) to limit cost and complexity. Also offsets ignoring wife's mortality. (This respondent uses single male life mortality assumption in valuation.)
5. One respondent stated "CIA basis" as answer to this question.
6. Use a discount for interest only before retirement.
7. Usually exclude (or report separately) the value of surviving spouse's benefits but include nonspousal death benefits.
8. Always include death after retirement in valuation in accordance with plan terms.
9. Never include spousal pension but have included orphan's benefits. After reviewing the Marsham case, not sure whether will continue doing so
10. Have included "minimum guarantees." However, same comment as above.
11. Will calculate these benefits and leave it up to the lawyer as to whether they be included or not.
12. If plan includes a preretirement survivor's benefits, would always take that into account. If preretirement death benefit is a refund of contributions only, then would usually ignore mortality during the year before retirement.
13. Normally exclude such benefits but would provide the increase in value as percentage if such benefits were included.

(Comment: There is clearly no uniformity here. These benefits can affect the value of the pension and so the issue is important. Note that if an interest-only assumption is made for the period until retirement, this makes an implicit allowance for a death benefit equal to the value of the pension.)

Question 9

The question is: Describe briefly the method and assumptions you would generally use to value death benefits (assuming you sometimes do value them). The following is the collection of responses.

1. Cost and understandability important. Would often use "no mortality preretirement" method.
2. Assume no survivor benefits and then depending on plan.
3. Actual, where applicable.
4. Allow for guarantees on pensions or return of contributions on death; same mortality assumption as for valuing pensions and using usual formulas.
5. After retirement — accurate including spousal; before retirement — implicit (discount for interest only).
6. CIA basis.
7. Not discounting for mortality prior to retirement or discounting excess of present value pension over accumulated contributions — when death benefit is return of contributions.
8. Based on same mortality and interest basis as is used to value the pension.
9. Value actual death benefits as provided for a plan without considering the possibility that there is no spouse eligible to receive the survivor benefits.

(Comment: Once again it seems as if the use of an interest-only preretirement assumption represents a common and pragmatic method of allowing for the value of preretirement death benefits.)

Question 10

The question is: How do you handle the indexation of pension credits in the following situations?

(a) Contractually guaranteed
(b) Ad hoc increases but given regularly
(c) Ad hoc increases not given regularly.

The responses are summarized below for each part separately.

Responses for Part (a):

1. Automatically included in valuation
2. Value according to plan
3. Only — as per CIA
4. Explicitly allow
5. Always value them but do lop 20% off "full indexing" re public sector plan to reflect affordability condition (in B.C. "inflation adjustment account")
6. Use 3% if full indexing
7. Built-in allowance
8. Project in relation to interest rate
9. Full provision included. (This is also the response for (b).)
10. ALWAYS value
11. No plans have provided this.

Responses for Part (b):

1. Pension valued with and without allowance for indexation, with explanation that increases in pension payments are not contractual. (This is also the response for (c).)
2. Ignored — deemed "earned" subsequent to marriage breakdown. (This is also the response for (c).)
3. For flat benefit plans, subject to collective bargaining, always show effect of allowing for indexing preretirement and postretirement; also give plan's history in both respects, and leaving the appropriate choices to lawyer and judge from here. (This is also the response for (c).)
4. Value, but stress in report that increases are ad hoc and not guaranteed.
5. Use 5% if half indexing, etc.
6. Ignored unless instructed otherwise.
7. Usually valued if given sufficient data on the amount and frequency of increases.
8. Value with no increases, plus ancillary valuation with projected increases.
9. Usually do not include unless the employer is committed to continue providing such increases. A good example of this is the OMERS (Ontario Municipal Employee Retirement System) plan -- indexing is not contractual but they say in the employee booklet that they will provide it.

Responses for Part (c):

1. Do not value but if know they have been given then will state in report
2. Ignored (most popular answer)
3. Never encountered.

(Comment: Part (a) — It seems as if this type of indexation is usually valued explicitly. Since such indexation is a valuable benefit, it has an important impact on the result.

Part (b) — There is clearly a wide variety of approaches in use here.

Part (c) — Irregular ad hoc pension increases seem to be generally ignored in the valuation.)

Question 11

The question is: Are there any other technical or actuarial issues that have a bearing on the calculations that have not been covered to date? (Read the next three questions to avoid overlap.) The following is the collection of responses:

1. The interpretation of how to apply the termination method. Think it is okay to use it for determining the amount of pension. However, do not think that it is appropriate to do the calculation assuming that the employee has in fact terminated. A "probability of termination" should be employed in arriving at the value. Otherwise, you might absolutely exclude the employee from such benefits as unreduced early retirement, etc.
2. Income tax adjustment (have used a number of different approaches, given the lack of legislative direction, but favor a projection of average tax rate after retirement)
3. Adjustment for premarriage entitlement (try to determine the value as of the date of marriage of the entitlement at that time)
4. Spousal benefits, survivor benefits and early retirement benefits
5. NO
6. Given proper data, there are few problems. Generally, information is available at calendar year-ends, and marriage breakdowns occur at different dates. Thus, interpolation usually needed to quantify accrued benefits.
7. Rarely is sufficient information available to complete an income tax deduction. Thus, this must be projected on a "best guesstimate" basis.

(Comment: The first response indicates difficulty with the interpretation and application of the termination method. Responses 2 and 7 refer to the difficulty of making a suitable adjustment to allow for income tax consequences. This appears to be a difficult issue and indeed is often avoided because of its complexity.)

Question 12

The question is: In your view, what are the main technical actuarial or valuation problems you face in this type of work? The following is the collection of responses to this question.

1. Collection of complete data
2. Allowance for taxes payable on projected retirement income
3. Valuation of career age earning plans that are regularly or periodically upgraded

4. Valuation of benefits that are subject to minimum benefit guarantees
5. Using the termination method only since it is the method that the Family Law Act implies and case law in Ontario adopts
6. Choosing a retirement date
7. Valuing nonvested benefits (requires withdrawal/persistency assumption)
8. Valuing survivorship benefits if included, as they vanish upon the marriage breakdown
9. Value as if termination of employment
10. Adjusting the accrued benefit to the duration of the marriage because exact records are rarely available
11. Work is heavily fee sensitive. Important to keep things understandable (often work that is sorely needed is just not wanted because of the fee sensitivity, even if the pension is "six figure"). There is also a real "let's get it over with" attitude involved, precluding thoughtful discussion.
12. Find the court's apparent embracing of termination method regrettable. It unfairly resolves all uncertainty in the pensioned spouse's favor. It is as if the court expects the nonpensioned spouse to pay for the privilege of receiving a lump sum. Also, think that the court does not fully understand the operation of final average pension plan.
13. The hardest technical problem to deal with is taxation. The difference between "registered" and "nonregistered" assets is significant. In order to do a proper job, you need a lot of detailed information on the individual situation and the final settlement.
14. Spousal benefits, retirement age and interest assumption (market vs. long term)
15. Choice of interest rates, particularly with excess interest indexing; when history of partial indexing; when no contractual agreement for upgrading pensions. Should they be recognized at all?
16. The accuracy added by some apparently sophisticated assumption is illusory. Prefer to avoid this, but some may feel better if included.
17. Preretirement benefits, treatment of pension credits earned before marriage, valuation of tax adjustment where the pension plan (e.g., government plan) will pay benefits to the member only
18. Interpretation of plan text (or other available documents) can be time-consuming and out of proportion to the perceived value of the service provided.

(Comment: The responses here cover a broad range of concerns. Income tax issues are viewed as especially difficult (2, 3 and 17). A number of respondents (6, 7, 14 and 15) indicated that the main problems related to the selection of appropriate assumptions. Some respondents (11 and 16) stressed the importance of simplicity and keeping the work at a level commensurate with the fee chargeable.)

Question 13

The question is: In your view, what are the main problems that arise from the legal environment within which you work? The following is the collection of responses; the order gives the popularity of the problems.

1. Lawyers' lack of understanding of pension-related issues and danger that results of the actuarial assessment will be misinterpreted
2. Occasional short deadlines

3. Request by lawyers to provide limited information (i.e., brief report) initially in the hope of reaching a settlement without incurring full charges for actuarial service
4. Lawyers
5. "Sometimes being asked to do calculations with assumptions I would not normally use and answering questions that do not cover all the issues in court"
6. Regulation 52 is unfair discrimination against nonmember spouses. (Quite a number of respondents feel that the termination method is biased in favor of the member spouse.)
7. Duplication of effort
8. No upfront agreement on assumptions before litigation
9. Conflicting guidelines between the Alberta Law Institute and the CIA minimum transfer values
10. Some judges want to exclude survivor benefits.
11. Lawyers tend to instruct and do not listen so actuaries are reduced to calculators even though actuaries' input may be useful.
12. The information we require is often difficult to get.
13. Lack of direction from family law or pension benefits legislation as to valuation method
14. Defective or unclear regulation of "if and when" division under Ontario PBA. (Ontario Pension Benefits Act)
15. Inconsistent court decision — using termination approach for valuation and retirement approach for "if and when" division
16. Certain plans (e.g., government plan) do not allow pension splitting. (This response came from Saskatchewan.)
17. Attempts to restrict choice of assumptions to ones that are totally inappropriate
18. There still seems to be some question in Nova Scotia as to whether or not pension entitlements form a part of matrimonial property.
19. Some people still think the value of pension entitlement should be measured by employee contributions plus interest only.

(Comment: The legal environment seems to pose quite a number of problems. For example, the courts have difficulty in understanding the issue. Some actuaries are concerned that they are requested to perform pension calculations using assumptions that they do not feel are appropriate (5, 10, 11 and 17). The time deadlines are occasionally short (2). All the required information is often difficult to obtain (12). Several respondents expressed concern about the legislation in this area and its interpretation by the courts (6, 9, 10, 13, 14, 15, 16, 18).)

Question 14

The question is: What are the other major types of problems you meet with in this type of work? The following is the collection of responses. The listing corresponds to the frequency of occurrence.

1. Difficulty in obtaining necessary information
2. Staying on top of any changes in precedents set through the courts
3. Complicated situation, many scenarios, fee sensitive clients
4. "Poor, unsound, incorrect, or misleading values provided by pension administrators, lawyers, the Saskatchewan superintendent, etc."
5. Fair splitting arrangements for small pensions, where proper work will not be paid for

6. Difficulty of providing objective advice in the adversarial environment
7. Concerns about fees where pension value is relatively small
8. Lack of consistency within the actuarial profession
9. Taxation question
10. No money for fees when a female spouse is represented
11. "Time. Lawyers want everything within 24 hours (so do research professors)."
12. Understanding the plan provisions with many times incomplete documentation
13. Doing the work at a reasonable price
14. Delay in collection of fees
15. Attempts by accountants to perform pension valuations, occasionally producing inappropriate results that prejudice settlement negotiations
16. Valuation by another actuary retained by the other side using a set of facts and assumptions prescribed by legal counsel.

(Comment: One of the main problems mentioned is the difficulty in obtaining the required information. There is a general concern about the amount of work required to do a thorough job given the existing fee structure. It was noted (6) that it is hard to provide objective advice in an adversarial environment. There will be a strong temptation for the lawyer to put pressure on the actuary he or she retains so as to produce valuation results that are in the best interests of the lawyer's client. Given the wide range of choices available, it is possible to arrive at a range of valuation results for a given fact situation.)

Question 15

The question is: Please add any other comments that would be useful or helpful. Only a few respondents answered this question. The following summarizes the responses.

1. There is a need for consistent guidelines.
2. Re: sample valuation (of this questionnaire). If only data received was as condensed, complete, then life would be easier.
3. The real problems are legal. The typical trust agreement does not permit a board of trustees to pay a benefit to anyone other than the retiree. In B.C., the Family Relations Act does not supersede trust law and, as a result, the adjustment for the value of the pension is usually done in other family assets — "you take the car, I take the pension." The leading case in B.C. on pension splitting is Rutherford vs. Rutherford, which evolved a mechanism for dealing with the above problem.
4. The tax implications are serious and are never properly addressed in decided cases. It's a real "crap shoot" to attempt to estimate the impact of taxes ultimately to be paid on the pension benefit.

(Comment: Most of the comments here have been given earlier. The need for more consistency is stressed (1), while it is also suggested that the real problems are mainly legal (3). Once again, it is noted that the taxation issue is usually sidestepped.)

6. Summary of Sample Valuation Reports

We received four completed sample reports from our respondents. These sample reports, based on the hypothetical pension plan and a couple, Harold and Anna, who are involved in the division of pension benefits, were prepared as if it were a real case. For reasons of confidentiality, we do not thank these respondents publicly, but we are extremely grateful to them for taking the time to prepare valuation reports for our survey. The following summarizes the methodology and assumptions used by the four reports and their corresponding recommendations on the value of pension benefits that are to be divided. Also, a brief comment follows the summary. The four reports will be designated as A, B, C and D. A description of BN pension plan and the information about the couple are included in Appendix I.

Report A

Valuation Method

The method used is the termination accrued benefit method.

Assumptions

Retirement age: 65
Indexation: nonindexed
Interest rate: 9.38% for 15 years from the date of valuation, 6% thereafter
Mortality: GAM83
Preretirement death benefit: excluded
Postretirement death benefit: excluded
Taxes: excluded, but suggested a projected average tax rate at 65 of 18%

Recommendation

The recommendation is $39,146, which represents the refund of the contributions with interest during the marriage. Using the above assumptions and valuation method, the report produced $27,439. The author of this sample report recommended $39,146 as the value for division because it is the larger of the two.

Report B

Valuation Method

The method used is the termination added value method.

Assumptions

Retirement age: 60
Indexation: nonindexed
Interest rate: 9.41% for 15 years from the date of valuation, 6% thereafter
Mortality: GAM83

Preretirement death benefit: give it separately
Postretirement death benefit: excluded
Taxes: not mentioned in the report

Recommendation

The recommendation is $45,234 if death benefits are excluded or $50,095 if preretirement death benefits are included.

Report C

Valuation Method

The method is the termination added value method.

Assumptions

Retirement age: 65
Indexation: both indexed (60% CPI after deferred period) and nonindexed
Interest rate: 8.5% with 5% inflation rate
Mortality: GAM83
Preretirement death benefit: excluded
Postretirement death benefit: excluded
Taxes: excluded, but suggested a projected average tax rate at 65 of 28%

Recommendation

The recommendation is $26,980 if not indexed or $32,760 if indexed at 60% CPI after deferred period.

Report D

Valuation Method

The method seems to be a termination accrued benefit method (not explicitly mentioned).

Assumptions

Retirement age: 65
Indexation: indexed at 60% CPI after deferred period
Interest rate: 10.5% for 15 years, 6% for next three years and 4.2% thereafter
Mortality: GAM83
Preretirement death benefit: included
Postretirement death benefit: included
Taxes: not mentioned in the report

Recommendation

The recommendation is $37,102, which represents the refund of the contributions with interest during the marriage.

Using the above assumptions and valuation method, the report produced $28,760. The author of this sample report recommended $37,102 as the value for division because it is the larger of the two.

From the above reports, we see that, even though the fact situation and the hypothetical pension plan given in the survey are extremely simple in comparison to the real world, different actuaries, even when they employ broadly similar methods and assumptions, arrive at different results. The recommended values ranged from $30,000 to $50,000. It is worth noting that the four results essentially employed the Canadian Institute of Actuaries valuation basis and that all four used the termination method. Two of the reports (B, C) used the termination added value method, and one used the termination accrued benefit method (A). We conjecture that Report D used the termination accrued benefit method. The numbers given in Report B are significantly higher than those in the other reports because it used an assumed retirement age of 60, whereas the other three reports used an assumed retirement age of 65.

Note also that the interest rate assumptions employed in the four reports differ, even though it is clear that the CIA minimum transfer value assumptions are being used as the basis for setting the interest rate assumptions.

7. Sensitivity Analysis

In this section, we examine the sensitivity of the computed value of pension benefits to different valuation methods and assumptions. These calculations are based on the same fact situation that was used to prepare the sample reports.

We consider four different types of valuation methods:

1. Termination prorated method. This method assumes the member spouse terminates employment on the date of separation. The pension benefit subject to division is then calculated by prorating the total accrued benefit by the ratio of the period of marriage to the period of membership in the plan.

2. Termination added value method. Under this method, the member spouse is assumed to have terminated employment on both the dates of marriage and separation. The difference between the present values of the accrued pension benefit on both dates, which are valued as of those dates, is the value to be shared between the spouses.

3. Termination accrued benefit method. This method is similar to the above method except that the present value of accrued pension on both dates is calculated at the date of separation.

4. Retirement method. Also called "projection method." It assumes the member spouse continues in employment until retirement. It prorates the projected benefit with future salary increases at retirement by the ratio of the period of marriage to the period of membership in the plan. This prorated benefit is then valued at the date of separation.

The calculations are carried out using different mortality tables:

1. GAM83[8]
2. GAM71[9]
3. Canadian Life Table 1980-82[10]

Four different types of pension indexation are considered:

1. Nonindexed
2. Fully indexed (including the deferred period)
3. Fully indexed after the deferred period
4. 60% CPI after the deferred period

These are denoted in the tables as (1), (2), (3) and (4), respectively.

Note: for the retirement method, we only consider (1), (3) and (4).

To simulate the above indexation, the following interest rates are used:[11]

1. For nonindexed pension, the first 15 years from the date of valuation — 9.5%; thereafter, 6% is used.

2. For fully indexed pension, 5.2% for the first year; 4.7% for the second year; 4.2% for the third year; 3.6% for the fourth year; and 3.0% for the remainder of the years from the date of valuation.
3. For a pension that is fully indexed in course of payment but nonindexed during the deferral period, we use the appropriate interest rate for nonindexed pension from the date of valuation to date of retirement and use the appropriate interest rate for fully indexed pension thereafter.
4. For 60% CPI indexation after the deferred period, we use geometric interpolation between 1 and 3 above as suggested by the CIA minimum transfer value method.
5. Under the retirement approach, the pension benefit has to to be projected to retirement. We assume a 2.5% differential between the rate of salary escalation and valuation rate of interest. Depending on the assumption of indexation after retirement, appropriate interest rates are used. Note that we also assume a withdrawal rate of zero under this approach.

Two retirement ages are considered:

1. 60
2. 65

Finally, the benefits are calculated on the basis that:

A. Excludes any death benefits
B. Includes only preretirement death benefit
C. Includes only postretirement death benefit
D. Includes both post- and preretirement benefits.

They are denoted in the tables as (A), (B), (C) and (D), respectively.

All the results are presented in Tables 8 through 19. The formulas used in this section are given in Appendix II. In some instances the results obtained using the termination methods are less than the accumulated amount of Harold's contributions with interest. In such cases, the higher figure (i.e., the accumulated contributions with interest) is normally used as the value of the pensions credit. Note that we have NOT followed this procedure in our computations.

There are several observations one can draw from these tables. However, keep in mind that some of these comments are dependent on the specific characteristics of the pension plan and the fact situation.

1. The assumed mortality rates affect the valuation results. The GAM83 table has the lightest mortality assumption, and so individuals are assumed to live longer under this table and pensions are more valuable, since they are assumed to be payable for a longer time period. The Canadian Population Mortality Table (CAN80-82) has the heaviest mortality rates, and so the discounted value of retirement pensions is smaller under this table. This effect is most clearly seen when death benefits are excluded,[12] column A of the various tables. Thus, for the case of an assumed retirement age of 65, the value of the pension benefit under the lightest mortality table (GAM83) is around 20% larger than that based on the heaviest mortality assumption (CAN80-82).

2. As far as the valuation method is concerned, the retirement method produces significantly larger values than those produced by the termination methods when deferred pensions are not indexed. For example, if we consider only the simplest form of pension benefits, i.e., without any ancillary benefits (column A), and with the retirement age assumption of 60, the value of the pension credit produced under the retirement method is 136%, 105% and 112% higher than the corresponding value produced by the termination prorated method, the termination added value method and the termination accrued benefit method, respectively. If the retirement age of 65 is used instead, the differences are even more significant with 184%, 158% and 168% in that order. Assuming that deferred pensions are not indexed, the retirement method produces the largest valuation results, followed by the termination added value method, the termination accrued benefit method and the termination prorated method. As the rate of indexation of deferred pensions increases, the gap narrows; and for full indexation both methods give comparable results.

3. The choice of retirement age in the valuation of pension credits is extremely important. This fact is vividly shown in the sensitivity analysis. If the retirement age assumption is changed from 65 to 60, the impact is significant, with the valuation increases in the range of 60-70%, depending on the mortality tables used.

4. Finally, the decision concerning whether or not to include the ancillary benefits (in this case, the pre- and postretirement benefits) also has a significant effect on the value of the pension entitlement. With the termination methods, the difference between inclusion and exclusion of these benefits is in the order of 30-90%.[13] Under the retirement method, the range is 30-45%.

As a check we have compared our results with those of the sample valuation reports. They are indeed close when we employ the same valuation method and use similar assumptions. For example, in Report A the value is $27,439; our figure based on the same assumptions is $27,103. Report B obtains a figure of $45,234 for the pension value without death benefits and $50,695 for the pension with preretirement death benefit. Our corresponding figures are $45,430 and $48,154. Report C reported $26,980 for the pension value without indexing and $32,700 for the pension value with 60% CPI indexing after the deferred period. Our corresponding figures are $28,109 and $32,420. No direct comparison can be made between Report D and our results, since the method and assumptions employed by the author of Report D cannot be clearly identified. Note that one obvious explanation for the minor differences between our results and those of the reports is the fact that the interest rates used in these valuations are slightly different.

8. Conclusions

This paper has explored various aspects of the complex topic of the valuation of pension benefits upon marriage breakdown.

From a Canada-wide survey of practicing actuaries, we have gathered some useful information on current practice and problems. Excluding the questionnaires that were sent to Quebec and adjusting for the fact that some questionnaires were sent to the same company and were subsequently responded to by the same actuary within the company, we have a good response rate (close to 40%). In addition, the respondents include a fair number of specialized practitioners in this area as they conducted, on average, at least 30 reports per annum in this area.

It is apparent from the survey that there are still many legal and technical issues unresolved. The survey highlights some of the more contentious issues on the subject.

In this paper, we also examine the sensitivity of valuation results to variations in technical actuarial assumptions and valuation methods. We have shown that by employing different assumptions and valuation methods, markedly different results can be obtained. The results we obtained ranged from an extreme low of $21,646 to an extreme high of $169,006.[14] This fact is also illustrated from the four sample valuation reports we received where the recommended values ranged from $30,000 to $50,000. It is hoped that research studies of this nature will be of assistance in the accurate diagnosis of some of the contemporary problems in this area and perhaps form the basis for subsequent research.

Endnotes

[1] B.C. tends to favor the so-called retirement approach, while Ontario usually employs the termination approach. The B.C. method tends to produce much larger values for the divisible pension asset.

[2] The "wait and see" method is often viewed as a settlement procedure rather than a valuation method.

[3] The CIA Task Force on the Division of Pension Benefits Upon Marriage Breakdown drafted a set of recommendations for discussion concerning the computation of the capitalized value of pension entitlements on marriage breakdown in February 1988.

[4] For assistance here we appreciate the comments of Bill Aitken, Keith Sharp, Mike Bennett, Alan Exley, Frank Reynolds and Rob Brown.

[5] Quoted from the response to one of the questionnaires.

[6] When this survey was conducted, the CIA had not yet come up with a set of specific recommendations concerning the valuation bases to be used in computing pension entitlement upon marriage breakdown. Instead, the minimum transfer value basis referred to here is another set of recommendations for the computation of minimum transfer values of deferred pensions. These two sets of recommendations are extremely similar.

[7] Consumer Price Index for Canada. CANSIM D484000.

[8] 1983 Group Annuity Mortality Table. Source: Transactions, Society of Actuaries 1983 Vol. 35, pp. 880-881, Tables 18-A, 18-B.

[9] 1971 Group Annuity Mortality Table. Source: Transactions, Society of Actuaries, 1971, Vol. 23, pt. 1, pp. 583-584, Table 10.

[10] Source: Statistics Canada, Catalogue 84-532.

[11] These interest rates are based on those recommended in the CIA minimum transfer value basis.

[12] The inclusion of the death benefits complicates the mortality comparison because, as mortality rates increase, the value of a pension annuity DECREASES and the value of a death benefit (e.g., a term insurance policy) INCREASES.

[13] Under the termination prorated method, and with Canadian Life Tables and retirement age of 65 assumptions, the value excluding any ancillary benefit is $20,254, whereas, with the inclusion of these ancillary benefits, it is valued at $38,434. An almost 90% increase!

[14] Under the termination prorated method and retirement age of 65, the nonindexed pension value without any ancillary benefits is $21,646. Under the termination added value method and retirement age of 60, the fully indexed (both during and after deferred period) pension value with ancillary benefits (both pre- and postretirement death benefits) is $169,006. The assumptions used to derive these two extreme figures are different, and it is unlikely that differences of such magnitude would occur in practice within a given fact situation.

Table-1		
Province	% Surveyed	% Responded
Alberta	8	25
British Columbia	23	17
Manitoba	2	50
New Brunswick	2	0
Nova Scotia	2	100
Ontario	36	27
Quebec	24	0
Saskatchewan	3	67

Table-2	
Province	% of Respondents
Alberta	9
British Columbia	17
Manitoba	4
Nova Scotia	13
Ontario	48
Saskatchewan	9

Table-3	
# of Valuations	% of Respondents
[0,5)	20
[5,10)	20
[10,30)	15
[30,50)	15
[50,100)	10
[100,-)	20

Table-4		
Type	Unweighted Average	Weighted Average
Member	42.9%	38.9%
Non-member	42.9%	48.0%
Both	13.6%	12.7%

Table-5	
Choice	% of Respondents
(i)	80
(ii)	32
(iii)	16
(iv)	11
(v)	30
(vi)	15

Table-6	
Choice	% of Respondents
(i)	25
(ii)	26
(iii)	11
(iv)	21
(v)	70
(vi)	11

Table-7		
	Death Before Retirement	Death After Retirement
Never Included In Valuation	20%	5%
Always Included In Valuation	50%	65%
Sometimes Included (explained circumstances)	30%	25%

Table-8

GAM83 (Termination Pro-rated Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	39,373	43,280	46,465	50,373
60	(2)	115,200	119,108	144,110	148,019
60	(3)	54,928	58,836	68,713	72,621
60	(4)	48,079	51,987	58,759	62,667
65	(1)	24,361	32,990	29,528	38,156
65	(2)	79,835	88,463	102,285	110,914
65	(3)	30,901	39,529	39,591	48,219
65	(4)	28,097	36,726	35,209	43,837

Table-9

GAM71 (Termination Pro-rated Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	36,113	41,472	43,389	48,748
60	(2)	104,027	109,386	132,297	137,656
60	(3)	49,601	54,959	63,080	68,439
60	(4)	43,688	49,046	54,311	59,670
65	(1)	21,646	33,428	26,494	38,277
65	(2)	69,958	81,741	90,243	102,025
65	(3)	27,078	38,860	34,930	46,712
65	(4)	24,759	36,541	31,274	43,056

Table-10

CAN80-82 (Termination Pro-rated Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	34,312	40,773	41,004	47,465
60	(2)	98.277	104,738	124,407	130,868
60	(3)	46,859	53,320	59,318	65,779
60	(4)	41,367	47,827	51,173	57,634
65	(1)	20,254	34,386	24,302	38,434
65	(2)	65,183	79,315	82,484	96,616
65	(3)	25,230	39,362	31,926	46,059
65	(4)	23,107	37,239	28,625	42,757

Table-11

GAM83 (Termination Added-Value Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	45,430	48,154	53,613	56,338
60	(2)	132,923	135,647	166,281	169,006
60	(3)	63,378	66,102	79,284	82,008
60	(4)	55,476	58,200	67,798	70,522
65	(1)	28,109	36,280	34,070	42,241
65	(2)	92,117	100,287	118,022	126,192
65	(3)	35,655	43,825	45,682	53,852
65	(4)	32,420	40,590	40,625	48,796

Table-12

GAM71 (Termination Added-Value Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	41,669	46,067	50,064	54,462
60	(2)	120,031	124,429	152,651	157,049
60	(3)	57,232	61,629	72,785	77,182
60	(4)	50,409	54,807	62,667	67,064
65	(1)	24,976	36,786	30,571	42,380
65	(2)	80,721	92,531	104,127	115,936
65	(3)	31,244	43,053	40,303	52,113
65	(4)	28,568	40,377	36,085	47,895

Table-13

CAN80-82 (Termination Added-Value Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	39,590	45,260	47,312	52,982
60	(2)	113,397	119,067	143,546	149,216
60	(3)	54,068	59,738	68,444	74,114
60	(4)	47,731	53,401	59,046	64,715
65	(1)	23,369	37,891	28,041	42,562
65	(2)	75,211	89,732	95,174	109,695
65	(3)	29,111	43,633	36,838	51,359
65	(4)	26,662	41,183	33,029	47,550

Table-14

GAM83 (Termination Accrued Benefit Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	43,804	48,313	51,694	56,203
60	(2)	128,164	132,674	160,328	164,838
60	(3)	61,109	65,619	76,445	80,955
60	(4)	53,489	57,999	65,371	69,881
65	(1)	27,103	37,059	32,851	42,806
65	(2)	88,819	98,775	113,796	123,752
65	(3)	34,379	44,334	44,046	54,002
65	(4)	31,259	41,215	39,171	49,127

Table-15

GAM71 (Termination Accrued Benefit Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	40,177	46,360	48,272	54,455
60	(2)	115,734	121,917	147,186	153,369
60	(3)	55,183	61,366	70,179	76,362
60	(4)	48,604	54,787	60,423	66,606
65	(1)	24,082	37,677	29,476	43,071
65	(2)	77,831	91,426	100,399	113,994
65	(3)	30,126	43,720	38,861	52,456
65	(4)	27,545	41,140	34,793	48,388

Table-16

CAN80-82 (Termination Accrued Benefit Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	38,173	45,628	45,618	53,073
60	(2)	109,337	116,792	138,407	145,862
60	(3)	52,133	59,588	65,993	73,448
60	(4)	46,022	53,477	56,931	64,387
65	(1)	22,533	38,839	27,037	43,343
65	(2)	72,519	88,825	91,767	108,073
65	(3)	28,069	44,376	35,519	51,825
65	(4)	25,708	42,014	31,847	48,153

Table-17

GAM83 (Retirement Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	92,933	96,974	109,672	113,714
60	(3)	129,648	133,690	162,185	166,227
60	(4)	113,482	117,524	138,690	142,732
65	(1)	72,578	81,501	87,969	96,892
65	(3)	92,060	100,983	117,949	126,872
65	(4)	83,708	92,630	104,894	113,817

Table-18

GAM71 (Retirement Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	85,240	90,781	102,413	107,955
60	(3)	117,074	122,616	148,890	154,432
60	(4)	103,118	108,659	128,192	133,734
65	(1)	64,489	76,673	78,932	91,117
65	(3)	80,672	92,856	104,063	116,247
65	(4)	73,761	85,945	93,171	105,355

Table-19

CAN80-82 (Retirement Method)					
Retirement Age	Type of Pension	Benefit Subject to Division ($)			
		(A)	(B)	(C)	(D)
60	(1)	80,987	87,669	96,782	103,464
60	(3)	110,603	117,285	140,010	146,692
60	(4)	97,640	104,321	120,785	127,467
65	(1)	60,339	74,954	72,401	87,016
65	(3)	75,165	89,780	95,116	109,730
65	(4)	68,841	83,456	85,280	99,895

9. APPENDIX I

This Appendix contains the questionnaire, details of the hypothetical pension plan and the fact situation of the mythical couple used in the survey.

THE QUESTIONNAIRE

Question #1

In what province is most of your work on the valuation and division of pension benefits carried out ?

Question #2

On average, how many pension valuations related to marriage breakdown do you conduct per annum ?

Question #3

What percentage (approximately) of these do you provide actuarial advice for the (i)Member _% (ii)Non-member _% (iii)Both parties together through one agreed upon report _%

Question #4

What method (methods) do you currently employ to compute the value of the pension benefit ?

(i) the termination approach
(ii) the retirement or projected approach
(iii) the "wait and see" or "if, as and when" approach

(iv) other approaches, please explain

(v) method depends on circumstances, please explain

(iv) more than one approach, please explain

Question #5

What actuarial assumptions do you normally employ in these computations?

(i) Canadian Institute of Actuaries (Minimum) Valuation Bases for Transfer Values

YES_____ NO_____

(ii) If you employ alternative assumption, please outline circumstances where you would do so.

(iii) Indicate and describe the representative assumptions you would employ concerning :

(A) Mortality

(B) Interest

(C) Salary Escalation

(D) Termination Rates

(E) Retirement Rates

(F) CPP Escalation

(G) Other Relevant Assumptions : Explain

Question #6

If there is a choice of retirement dates which of the following best summarizes your approach ?

(i) Use the Normal Retirement Date

(ii) Use a range of possible retirement dates and produce several valuations

(iii) Use a range of retirement dates and use probabilities of retirement to compute a single number

(iv) Use the most likely or most probable retirement date as instructed by your lawyer or the court

(v) First retirement date at which employee can qualify for unreduced benefit

(vi) Other: Please explain carefully

Question #7

Assuming the employed spouse is a male, do you value the pension benefit to be divided using

(i) A single male life mortality assumption

(ii) A joint life mortality assumption during active period

(iii) Unisex Table

(iv) Other: Please explain in detail

Question #8

In carrying out such valuations, what is your approach to the inclusion of the value of death benefits ?

	Death Before Retirement	Death After Retirement
Never Included In Valuation		
Always Included In Valuation		
Sometimes Included (explained circumstances)		

Question #9

Describe briefly the method and assumptions you would generally use to value death benefits (assuming you sometimes do value them).

Question #10

How do you handle the indexation of pension credits in the following situations :

(a) Contractually guaranteed
(b) Ad hoc increases but given regularily
(c) Ad hoc increases not given regularily

Question #11

Are there any other technical or actuarial issues that have a bearing on the calculations that have not been covered to date ? (Read the next 3 questions to avoid overlap).

Question #12

In your view, what are the main technical actuarial or valuation problems you face in this type of work?

Question #13

In your view, what are the main problems which arise from the legal environment within which you work?

Question #14

What are the other major types of problems you meet with in this type of work?

Question #15

Please add any other comments that would be useful or helpful.

THE BN PENSION PLAN

Type of Plan

Final Average Salary (Three years are used to compute Final Average Earning)

Pension Formula per year of service : 2%

Integration : Use Benefit Step Rate

2% above YMPE

1.4%up to YMPE

Contributions

6% above YMPE

4.5%up to YMPE

Normal Retirement Age : 65

with unreduced benefits as early as age 60, if age + service = 85

Normal Form

A life annuity with a 60% pension to the surviving spouse.

Early Retirement

Early retirement can take place from age 55 onwards provided the member has ten years pensionable service. The early retirement pension is equal to the accrued pension as at the date of early retirement reduced as follows : the reduction is equal to 5% for each year from the date of early retirement to the date when the member would have first been eligible for an unreduced normal retirement pension.

Death Benefit (before retirement)

A lump-sum equal to the refund of the member's contributions with (6% p.a.) interest. If the member dies in service after becoming eligible for an early retirement pension the death benefit is computed as if the member retired on the day before death occurred.

Death Benefit (after retirement)

As indicated above the normal form of retirement pension automatically induces a 60% pension to the surviving spouse.

Vesting

Age 45 and ten years service.

Termination Benefits

A deferred pension payable at normal retirement age equal to the full normal retirement pension earned by member until date of termination.

Indexation

There is no automatic indexing of pensions. However, the plan sponsor has for the past several years increased pensions in course of payment by approximately 60% of the increase in the Consumer Price Index. This increase has not been granted to deferred pensions while they are in the deferral period.

	Employee Spouse	Non-employee Spouse
Name	Harold C. Earwicker	Anna L. Plurabelle
Date of Birth	1.1.1940	1.1.1943
Sex	male	Female
Health	Good	Good

Date of marriage	1.1.1974
Date of separation	31.12.1986
Date of divorce	31.12.1987
Date of valuation	31.12.1986
Date of Commencement of Employment	1.1.1970
Date of Commencement of Pensionable Service	1.1.1972
Salary during the calendar year 1986	$60,000
Average Salary for three years ending December 31, 1986	$56,820.28
Accrued pension as at 31.12.1986	$14,946.08 p.a.
Employee contributions as at December 31, 1986 with 6% p.a. interest	$40,930.60

Other assumptions :

Contributions made at the start of the year. Pension payments, monthly in advance.

Record of Earnings and Contributions to BN Pension Plan.

Year	Salary	YMPE	Employee contributions as at start of year i.e. on Jan. 1	Employee contributions with (6%) interest at end of year i.e. on Dec. 31
1972	$14,334.97	$5,500.00	$777.60	$824.25
1973	15,731.20	5,600.00	859.87	1,785.17
1974	17,128.13	6,600.00	928.69	2,876.69
1975	19,759.01	7,400.00	1,074.54	4,188.31
1976	23,003.44	8,300.00	1,255.71	5,770.65
1977	26,039.89	9,300.00	1,422.89	7,625.16
1978	28,654.30	10,400.00	1,563.26	9,739.72
1979	31,064.12	11,700.00	1,688.35	12,113.76
1980	34,356.92	13,100.00	1,864.92	14,817.39
1981	38,977.93	14,700.00	2,118.18	17,951.70
1982	44,204.87	16,500.00	2,404.79	21,577.88
1983	49,306.11	18,500.00	2,680.87	25,714.27
1984	53,857.06	20,800.00	2,919.42	30,351.72
1985	56,603.77	23,400.00	3,045.23	35,400.76
1986	60,000.00	25,800.00	3,213.00	40,930.59

Assumption

Salary increase at the rate of wage escalation represented by Wage and Salary Index of the Canadian Institute of Actuaries Report on Economic Statistics (for the year 1986) plus 2% p.a.

10. APPENDIX II

In this appendix, the formulae used in calculating the pension benefits, presented in the Sensitivity Analysis Section, are given.

NOTATION :

1. AP : accrued pension benefits at age 47
2. C : accumulated contributions with interest (6%) up to age 47
3. x : retirement age (either 60 or 65)
4. i_j : interest rate used at time j

FORMULAE :

Present value of pension benefits excluding death benefits both before and after retirement:

$$AP \times \left\{ \frac{1}{1+i_1} \times \cdots \times \frac{1}{1+i_{x-47}} \right\} \times {}_{x-47}p_{47} \times \ddot{a}_x^{(12)}$$

note:

Both the whole life annuity value ($\ddot{a}_x^{(12)}$) and the probability of surviving (${}_{x-47}p_{47}$) are based on single male life table.

Present value of death benefits before retirement (i.e. return of contributions with interest) :

$$C \times \left\{ q_{47} \times \left(\frac{1.06}{1+i_1} \right) + p_{47} \times q_{48} \times \left(\frac{1.06}{1+i_1} \right) \times \left(\frac{1.06}{1+i_2} \right) + \cdots \right.$$

$$\left. + \; p_{47} \times \cdots \times p_{x-2} \times q_{x-1} \times \left(\frac{1.06}{1+i_1} \right) \times \cdots \left(\frac{1.06}{1+i_{x-47}} \right) \right\}$$

note:

We assume the amount of accumulated contributions is refunded at the end of the year of death.

Present value of pension benefits with death benefits after retirement (i.e. joint life annuity) :

$$ {}_{x}p^{\overline{m}}_{47} \times {}_{x-3}p^{f}_{44} \times \left\{ \frac{1}{1+i_1} \times \cdots \times \frac{1}{1+i_{x-47}} \right\} \times \left\{ \ddot{a}_x^{(12)m} + .6\, \ddot{a}_{x-3}^{(12)f} - .6\, \ddot{a}_{\overline{x:x-3}}^{(12)} \right\} $$

note:

The superscripts, f and m, denote the female and male single life, respectively.

COMMENTS :

1. For the Termination Pro-Rated Method, all the above formulae are multiplied by 13/15, and appropriate interest rates are used. AP = 14946.08.
2. For the Termination Added-Value Method, AP = 14946.08, all the above formulae are reduced by 1785.17 (This figure represents the present value of pension benefits of the employee if he would have terminated employment at the date of marriage).
3. For the Termination Accrued Benefit Method, AP = 14411.08 (14946.08 - 535.00), where 535.00 is the accrued pension benefits at the date of marriage.
4. For the Retirement Method, use 2.5% as the differential between the rate of salary escalation and valuation rate of interest (i.e. i_j = 2.5% for $j = 1,\ldots,x-47$), all the above formulae are multiplied by 13/15 with AP = 14946.08.

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The International Foundation's Grants for Research Program was established to encourage graduate students and professional researchers to pursue the study of problems having legal, economic, social or political consequences for the employee benefits field.

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State Tax Consequences of IRA Distributions for Nonresidents

Anthony P. Curatola

An employee who retires from a company that sponsors a qualified retirement plan will more than likely receive a distribution of the vested retirement assets. Generally, this distribution is in the form of a pension annuity, cash, corporate securities, property or any combination of the aforementioned.

Not all employees, however, are covered by company-sponsored retirement plans. A survey conducted by the U.S. Bureau of the Census (1973) estimated that only 47% of full-time workers are covered by retirement plans. Thus, the majority of full-time workers in private industry were not covered at this time by an employer-sponsored plan.[1]

> The 93rd Congress concluded that those employees
> . . . who are not covered under a qualified plan are disadvantaged by the fact that earnings on their retirement savings are subject to tax and grow more slowly than the tax-sheltered earnings on contributions to a qualified plan.[2]

To provide relief in this area, in 1974 Congress created a type of individual retirement trust fund commonly referred to as an *IRA*.[3] IRAs were for the benefit of wage earners not covered by an employer-sponsored qualified retirement arrangement (QRA). Thus, the legis-

lation limited IRA investments to those wage earners not covered by a QRA.

Although Congress intended the IRA to be a substitute for the QRA, the tax rules applicable to an IRA and a QRA are not always the same. Congress legislated that

> . . . all amounts received from an individual retirement account will be taxed in full as ordinary income, since neither the contributions nor the earnings thereon will have been subject to tax previously. No capital gains or special lump-sum distribution rules are to apply to receipts from these accounts.[4]

Thus, the taxable amount distributed from an IRA is included in federal gross income and, therefore, taxed as ordinary income. Taxable amounts distributed from a QRA also are included in federal gross income and taxed as ordinary income unless the distribution qualifies as a lump sum distribution (LSD). An *LSD* is a total distribution of all amounts from a QRA that satisfies certain conditions presented in Section 402(e)(4)(A) and not expressly excluded. If a taxpayer receives an LSD, the taxpayer can elect a special tax averaging provision. That is, the taxable amount can be taxed separately under the five year forward averaging (5YA) rules and the applicable tax rates for the year of the distribution.[5] If a taxpayer is 50 years of age, or older, before January 1, 1986, the taxable amount can be taxed separately under the five year or ten year forward averaging (TYA) rules.[6] Unlike the 5YA rules, the election of TYA requires the use of the 1986 tax rates.

Forty-three states and the District of Columbia impose some form of individual state income tax in addition to federal income tax. Connecticut, New Hampshire and Tennessee limit the income subject to tax to interest and dividends; the remaining 40 states and the District of Columbia have more broad based tax structures that conform to the federal income tax laws.[7] Generally, this conformity extends to the tax treatment of contributions and distributions from IRAs; wage earners who are permitted a federal deduction for contributions to an IRA are also permitted a deduction for state income

tax purposes.[8] This provision results in an investment with a state and federal income tax basis of zero.[9]

Most states require that the amount distributed, less any state income tax basis in the IRA, be included in gross income. Individuals who retire in the same state where deductions for IRA contributions were taken should have little difficulty complying with such laws. The taxable amount of a distribution should be the same amount reported for federal income tax purposes.

Not all individuals, however, reside, earn wages and retire in a single state. This anomaly raises at least two questions. First, in which state or states (state of current residence or state(s) of former residence or both) will the distributed amount be taken? Second, what is the basis of the IRA investment for state income tax purposes? This report examines these questions and draws the conclusion that of the 41 states[10] with an income tax law, 12 states currently have tax provisions that tax nonresidents when they make a withdrawal from their IRA. As for the basis, this amount depends on various state factors.

Congress and the Multistate Tax Commission have acknowledged the problem of state tax on pensions of nonresidents. Thus, in the author's opinion, it is time to formulate a state tax provision that addresses the issue. This report presents such a provision that attempts to equalize state income taxes of residents within a state regardless of when domicile is established and to allow states to recapture tax benefits provided prior residents when they establish domicile elsewhere.

LEGISLATIVE HISTORY

The legislative history of IRAs originates in the federal tax laws. A review of this area is necessary to appreciate the legal and practical problems associated with state income tax laws and former residents.

Federal

The IRA has been available to some or all wage earners since 1975. Its legislative history corresponds to three philosophical eras

Figure 1

PHILOSOPHICAL ERAS OF IRA

Era	Time Frame	Philosophy
ERISA	1975-81	Contribution limited to wage earners *not* covered by employer-sponsored qualified plan.
ERTA	1982-86	Contribution limited to wage earners.
TRA '86	1987-present	Contribution limited to wage earners *but* deduction of contribution is limited to wage earners *not* covered by employer-sponsored qualified plan or, if covered, to wage earners with AGI amounts below a specified level.

(see Figure 1): ERISA, ERTA and TRA '86.[11] The ERISA period was characterized by IRA eligibility for those wage earners who were not covered by an employer-sponsored qualified plan.[12] These wage earners were permitted by Section 219 of the Internal Revenue Code[13] to contribute an annual amount not to exceed the lesser of 15% of earned income or $1,500 ($1,750 in the case of a spousal IRA) to their IRA. Congress permitted these wage earners to deduct the amount contributed for federal income tax purposes and to defer the tax on the IRA's earnings until they were withdrawn.

The reaction by taxpayers to the IRA investment opportunity for the ERISA period is shown in Table I. As the table indicates, the annual participation by all taxpayers filing a federal return ranged from a low of 1.5% in 1975 to a high of 3.6% in 1981. Taking into account that approximately half of the filing taxpayers were eligible to make an IRA contribution, the annual participation rates for the ERISA period (bottom row of Table I) are relatively low.

The same table shows that the participation rate by adjusted gross income (AGI) classification (rates within each column of Table I) is biased toward the upper income taxpayers. In other words, upper income taxpayers took advantage of the IRA investment. Although this

Table I

PERCENTAGE OF TAXPAYERS CONTRIBUTING TO IRAS BY AGI CLASSIFICATIONS: ERISA PERIOD (1975-1981)

AGI Classification	1975	1976	1977	1978	1979	1980	1981	APR** By AGI Class.
0- 4,999*	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.15
5,000- 9,999	0.7	0.9	0.9	1.1	0.8	0.6	0.9	0.83
10,000-14,999	1.4	1.8	2.0	2.2	1.8	1.6	1.9	1.81
15,000-19,999	2.1	2.6	2.7	2.8	2.7	2.5	2.9	2.60
20,000-24,999	3.4	3.7	4.3	4.1	3.6	4.0	4.5	3.96
25,000-29,999	4.9	5.8	5.8	5.6	4.8	4.4	5.6	5.23
30,000-49,999	7.5	7.6	8.5	9.2	8.4	7.8	8.8	8.43
50,000-99,999	10.1	12.5	13.5	14.7	14.8	14.2	16.0	14.41
100,000 and above	8.0	9.9	11.5	12.3	12.8	12.3	14.5	12.32
Annual Participation Rate	1.5	1.9	2.3	2.7	2.7	2.7	3.6	2.51

Notes:
*This class contains a small number of returns on which the estimate is based.
**APR—Average Participation Rate by AGI classification.
Source: Internal Revenue Service (Annual editions 1975-1981, Tables 1.1 and 1.3).

is not surprising, the bias is even more evident when the percentage of employees eligible to participate in an IRA by income class is considered. Table II (1972 column) shows that the percentage of full-time workers covered by an employer- or union-provided plan increases as income increased. Even though Tables I and II have different measures of income (i.e., AGI versus wage/salary) and Table II does not include part-time workers, a general observation can be drawn. Specifically, more of the upper income wage earners had some form of coverage in comparison to the lower income wage earners.

Table II also provides the percentage of wage and salary workers with QRA by salary income for both full-time workers and all workers for 1979, 1983 and 1985. As the percentages indicate, more workers are covered by QRA in 1985 than in 1972.[14] Yet, QRA coverage is available to less than 50% of all workers and to less than 52% of all full-time workers.

During the ERTA period, legislated by Section 311(a) of the Economic Recovery Tax Act of 1981, the availability of IRAs was considerably broadened. Wage earners and/or spouses, regardless of employer-sponsored plan coverage, were eligible to take deductions for contributions to IRAs in tax years beginning after 1981. In addition, the annual deductible amount was increased to the lesser of 100% of earned income or $2,000 ($2,250 in the case of a spousal IRA). Not surprisingly, wage earners who previously were not eligible took advantage of this legislation.

Table III shows the IRA participation rate for all taxpayers filing a federal income tax return during the ERTA period. Because all wage earners were eligible during this period, these rates correspond to actual participation. The annual participation rate increased from something less than 3.6% in 1981 (Table I) to 12.6% in 1982 (Table III), which is a nine percentage points increase, and continued to drift upward to a high of 16.1% in 1985. Note that the bias of the IRA participation rate by AGI classification revealed by Table III is more evident than the one shown in Table I.

Congress broadened the IRA to all wage earners in 1982 for the purpose of increasing savings.[15] Studies (DeMagistris and Palash 1982-

Table II

PERCENTAGE OF WAGE AND SALARY WORKERS 15 YEARS OLD AND OVER WITH EMPLOYER- OR UNION-PROVIDED PENSION PLAN COVERAGE BY WAGE OR SALARY INCOME FOR SELECTED YEARS*

Wage and Salary Income Classes	1972	1979	1983	1985
1- 4,999	30.0	14.9	11.1	9.2
5,000- 9,999	58.0	39.1	27.6	23.0
10,000-14,999	73.0	62.6	49.0	41.5
15,000-19,999	76.0	74.7	64.2	60.0
20,000-24,999	67.0	80.8	73.2	68.2
25,000-34,999		79.8	77.6	74.9
35,000-49,999	71.0	76.7	77.5	79.3
50,000 and above		68.9	73.1	73.4
Percentage Covered	47.0	53.9	52.9	51.7

These percentages correspond to individuals with full-time employment as a percentage of all full-time jobs.

Sources: U.S. Department of Commerce (1973, Table 6) and U.S. Bureau of the Census (1980, Tables 25 and 35; 1983, Tables 4 and 14; 1985, Tables 4 and 14).

Table II *(Continued)*

Wage and Salary Income Classes	1972	1979	1983	1985
1- 4,999		10.2	6.9	5.8
5,000- 9,999		38.0	25.8	21.9
10,000-14,999		62.1	48.5	40.9
15,000-19,999		74.5	63.8	59.4
20,000-24,999		80.6	73.1	68.1
25,000-34,999		79.5	77.3	74.6
35,000-49,999		76.3	77.2	79.2
50,000 and above		69.0	72.9	72.9
Percentage Covered	NA	44.9	43.4	42.8

These percentages correspond to all wage and salary workers as a percentage of all wage and salary workers.

Sources: U.S. Department of Commerce (1973, Table 6) and U.S. Bureau of the Census (1980, Tables 25 and 35; 1983, Tables 4 and 14; 1985, Tables 4 and 14).

Table III

PERCENTAGE OF TAXPAYERS CONTRIBUTING TO IRAS BY AGI CLASSIFICATIONS: ERTA PERIOD (1982-1986)

AGI Classification	1982	1983	1984	1985P	1986P	Average Participation Rate by AGI Classification
0- 4,999*	0.7	0.8	0.8	0.9	1.0	0.84
5,000- 9,999	2.5	2.9	3.6	3.0	2.8	2.96
10,000-14,999	5.1	6.1	6.7	6.0	5.4	5.85
15,000-19,999	9.6	10.6	11.1	10.8	9.2	10.26
20,000-24,999	13.5	15.6	16.1	16.1	14.0	15.06
25,000-29,999	19.3	21.1	20.3	22.2	18.9	20.33
30,000-49,000	31.0	31.9	31.8	31.5	28.4	30.83
50,000-99,999	55.4	57.3	56.5	56.2	51.4	54.98
100,000 and above	62.4	66.8	68.2	70.5	70.2	68.29
Annual Participation Rate	12.6	14.1	15.3	16.1	15.2	14.70

Notes:
P Preliminary data.
* This class contains a small number of returns on which the estimate is based.
Source: Internal Revenue Service (Annual editions 1982-1984, Tables 1.1 and 1.3; Quarterly Winter Bulletins 1986-1987 and 1987-1988, Table I).

1983) as well as testimony given[16] before Congress indicated that IRAs failed to achieve this goal. Rather, taxpayers appeared to shift other investments within their portfolios to IRA investments. This observation was apparently instrumental for the IRA legislation in TRA '86. According to the Committee on Finance, United States Senate (1986, 542)

> . . . since 1981, the expanded availability of IRAs had no discernible impact on the level of aggregate personal savings. . . . Further, data have consistently shown that IRA utilization is quite low among lower-income taxpayers who may be the least likely to accumulate significant retirement savings in the absence of a specific tax provision. . . . Thus, the committee finds it appropriate to reinstate the rules prior to ERTA, which limit IRA deductions to those taxpayers who are not covered by an employer-provided pension plan.

The views expressed by the Senate are certainly consistent with the data previously shown in Tables I, II and III. However, at a recent Ways and Means Committee hearing, Summers (Tax Notes 1989b, G-4) told the committee that

> . . . surveys of savers suggest that about half of the savings put into IRAs represented new savings. Further, the tax incentive may also have helped change public attitudes by causing people to focus on the need for savings.

Tables I and III suggest that IRAs were not sought by wage earners with less than $20,000 of AGI and were only modestly sought by wage earners with AGI amounts between $20,000 and $50,000.[17] Two explanations can be found in the report of the Joint Committee on Taxation (1985, 12-16) that was prepared for the House and Senate in their deliberations of tax reform. The first explanation centers on the progressivity of the tax rates that produce greater tax benefits to those taxpayers with higher AGIs. Hubbard (1984) demonstrated that the propensity to save increases as the marginal tax rate increases. The second explanation is the restrictions that exist on withdrawing IRA funds before age 59½. As reported by the Joint Committee on Taxation (1985, 15, fn. 6)

> . . . a 1985 survey of individuals conducted by the Invest-

ment Company Institute shows that many people believe they would be more likely to make IRA contributions if the withdrawal restrictions were eliminated.

Congress, however, did not remove the withdrawal restrictions and did not entirely revert back to the ERISA period IRA rules. Instead, the Conference Committee (1986, II-376) modified the Senate amendment to allow all wage earners to make an annual contribution to their IRA and to limit the deductibility of an IRA contribution to wage earners not covered by an employer-sponsored qualified plan or any wage earner with an AGI below a specified amount. Put another way, TRA '86 rules exclude those wage earners with QRA coverage and high AGI amounts from deducting their IRA contribution if one is made.[18]

O'Neil and Thompson (1987, G 22) predicted that the IRA participation rate would fall substantially below the pre-1982 levels. Two reasons were offered for this conclusion. First, there will be a reduction in the number of contributing taxpayers who are eligible (i.e., taxpayers with high AGI amounts). Secondly, the maximum marginal tax rate dropped to 28%.

Table IV presents preliminary IRA data for 1987, the only data available under the new tax law. As predicted by O'Neil and Thompson, the IRA contributions have dropped significantly. However, Tables IV and V do not entirely support O'Neil and Thompson's first reason (i.e., loss of deductibility).

Table V presents the cumulative percentage of individual income tax returns by AGI and filing status for 1987. This table shows that most taxpayers would more than likely qualify for an IRA deduction in 1987. Approximately 78% of the filing taxpayers in 1987 who claimed married joint or surviving spouse would be eligible to deduct all or part of their IRA contribution in 1987 under the new TRA '86 rules. Conversely, approximately 22% of these taxpayers had $50,000 or more of AGI in 1987. Of this 22%, some taxpayers will be permitted to deduct an IRA contribution because they are not covered by an employer-sponsored QRA. With respect to the taxpayers filing as single or head of household, less than 10% of these taxpayers had an AGI amount

Table IV

PERCENTAGE OF TAXPAYERS CONTRIBUTING TO IRAS BY AGI CLASSIFICATIONS: TRA '86 PERIOD (1987)

AGI Classification	1987P
0- 4,999*	0.6
5,000- 9,999	2.0
10,000-14,999	4.0
15,000-19,999	6.0
20,000-24,999	10.1
25,000-29,999	12.8
30,000-49,999	14.8
50,000-99,999	6.9
100,000 and above	11.4
Annual Participation Rate	6.9

Notes:
P Preliminary data.
* This class contains a small number of returns on which the estimate is based.
Source: Internal Revenue Service (Spring 1989, Table 1).

of $30,000 or more.[19] In other words, TRA '86 appears to have excluded few taxpayers from deducting all or part of their IRA contribution.

As already noted, Table III includes preliminary statistics for 1986. This year, in comparison to 1985, shows a decline in taxpayers electing to contribute to an IRA. Since TRA '86 was signed into law October 22, 1986 and taxpayers had up to April 15, 1987 to contribute for the 1986 year, taxpayers would be expected to have taken advantage of this program in its final year. Instead, contributions fell for most AGI classifications.

The drop in the tax rate as noted by O'Neil and Thompson is one explanation. Another explanation for a drop in the IRA participation rate is taxpayer perception about the future of IRAs. If taxpayers believe Congress may restrict or expand the level of IRA contributions, deductions and/or taxability, then taxpayers' participation should reflect their negative or positive perceptions. This explanation, although not formally investigated in this report, does find some evidence to support it.

ERTA broadened the availability of IRA participation for the 1982 tax year and thereafter. Table I, however, shows that IRA participation increased for the 1981 tax year (i.e., the last year under the ERISA rules). Also, the participation rate remained relatively constant for the 1978-1980 period. This spurt in participation for 1981 is consistent with a positive taxpayer perception about the future of IRAs.

In TRA '86, Congress eliminated the deductibility of IRA contributions to some taxpayers. Table IV indicates that the participation rates for the two highest AGI classifications dropped below most ERISA period levels. This drop in participation would be expected since these individuals lost the deduction. But Table IV also shows the participation rate for all other AGI classes dropped. Since these wage earners may still deduct IRA contributions, another explanation is needed for the drop in participation rate. As in the case of 1981 when a positive perception toward IRAs was projected by Congress, taxpayer behavior in 1986 may be explained as a negative projection by Congress.

The loss of deductibility is not the only negative signal about IRAs sent by Congress in TRA '86. Section 4981A of the Internal Revenue Code, which was added by Section 1133(a) of TRA '86, imposes a 15% excise tax on excess distributions.[20] The term *excess distributions* is defined as the aggregate amount of the retirement distribution with respect to any individual during any calendar year to the extent such amount exceeds $150,000 or $112,500 adjusted annually for inflation.[21] Also, these amounts are increased five times in the case of a lump sum distribution.[22] This excise tax is a penalty assessed against taxpayers who accumulate retirement holdings that are "too large."

Thus, the attractiveness of investing in an IRA is diminished for those wage earners covered by a plan or plans. Moreover, the definition of *too large* may be changed by Congress at any time. In light of the fact that IRAs were not overwhelmingly received by wage earners during the ERISA and ERTA periods, the provisions of the excise tax and the partial or total loss of deductibility for some wage earners may have been interpreted as a signal from Congress. The message is that IRAs have a dim future.

STATES' TAX POLICY

The review of the federal tax laws and IRA participation sets the background for studying the state income tax consequence to nonresidents. As mentioned earlier in this report, individuals residing in 44 states pay some form of a state income tax in addition to the federal income tax. Connecticut, New Hampshire and Tennessee limit the income subject to tax to items such as interest and dividends; the remaining 41 states have more broad based tax structures that conform to the Internal Revenue Code. Generally this conformity, in the sense of piggybacking the federal laws, extends to the tax treatment of contributions and distributions from QRAs and IRAs. There are, however, exceptions to this rule.

ERISA and ERTA Period

The state income tax treatment for QRAs and IRAs was presented in previously published Research Report 86-5 (RR 86-5) (Curatola 1986). In brief, RR 86-5 reported that of the states with income tax laws, all except Massachusetts, New Jersey and Pennsylvania have made provisions to allow the deduction of IRA contributions for state income tax purposes. California and Georgia permit IRA contributions to be deducted under certain circumstances and also limit the amount that may be deducted. The deductible amount under both state laws[23] is limited to the lesser of $1,500 or 15% of earned income. Moreover, if the taxpayer is covered by a qualified pension plan, no deduction is permitted for contributions to IRAs. These laws conform to the rules of the ERISA period for federal income tax purposes. Neither state

modified its IRA provision to conform to the ERTA provisions. Because these five states do not conform to federal law, taxpayers in these states must maintain state income tax records to substantiate their state tax basis in IRA holdings. These five states, as well as all other states with income tax laws, have state tax provisions to defer the tax on the IRA's earnings until taxpayers withdraw part or all of their IRA funds.

Another significant difference reported in RR 86-5 concerned the state tax applicable to distributions from IRAs and QRAs. Distributions from QRAs were provided special tax treatment in 21 of the 41 states with income tax laws. The special tax provisions are basically of two types: ten year averaging provision or exemption from tax provision. Table VI (columns 2 and 3) gives a comparison of state income tax provisions for retirement plans for pre-1987 tax years. This period corresponds to the ERISA and ERTA periods.

TRA '86

The enactment of TRA '86 limited the full IRA deduction provision to those wage earners not covered by a qualified plan or below the stated AGI amount. As a result, wage earners who are not eligible for a deduction and still contribute to an IRA create a nonzero basis in the IRA investment. Since most states historically have conformed to the Internal Revenue Code, most states, including California and Georgia, have adopted the TRA '86 provisions. Arkansas permits taxpayers to deduct their full IRA contribution, while Kentucky permitted the full deduction for the 1987 tax year only. Conformity to the Internal Revenue Code in the area of deferred compensation with a nonzero tax basis presents a problem to those who move to a new state.

Residents Versus Nonresidents

By conforming to the federal tax provisions, individuals who have been resident wage earners of only one state, and who retire in that state, have little difficulty determining the state taxable amount of an IRA distribution for state tax purposes. The taxable amount for state purposes would be the same as for federal income tax purposes.

Table VI

COMPARISON OF STATE INCOME TAX PROVISIONS FOR RETIREMENT PLANS

State	Contribution by Employee to IRA	Distribution	
		Employee-Sponsored IRA	Employer-Sponsored QRA and TYA Elected
AL	Ded.	All/Part (3): Ord. Inc.	All: Ord. Inc.
AK	(1)	(1)	(1)
AZ	Ded.	All: Ord. Inc.	All: Ord. Inc.
AR	Ded. (16)	All: Ord. Inc.	All: AR's TYA
CA	Limited Ded. (4)	All/Part (3): Ord. Inc.	All: CA's 7 yr. avg. (15)
CO	Ded.	All: Ord. Inc.	All: Ord. Inc.
CT	(5)	(5)	(5)
DE	Ded.	All: Ord. Inc.	All: DEs TYA
DC	Ded. (2)	All/Part (3): Ord. Inc.	All: Ord. Inc.
FL	(1)	(1)	(1)
GA	Limited Ded. (4)	All/Part (3): Ord. Inc.	All: Ord. Inc.
HI	Ded.	All: Ord. Inc.	Not Taxable (12)
ID	Ded.	All: Ord. Inc.	All: Ord. Inc.
IL	Ded.	All: Ord. Inc.	Not Taxable
IN	Ded.	All: Ord. Inc.	All: Ord. Inc.
IA	Ded.	All: Ord. Inc.	25% of TYA Tax
KS	Ded.	All: Ord. Inc.	13% of TYA Tax

Table VI *(Continued)*

State	Contribution by Employee to IRA	Distribution	
		Employee-Sponsored IRA	Employer-Sponsored QRA and TYA Elected
KY	Ded. (17)	All: Ord. Inc.	All: KY's TYA
LA	Ded.	All: Ord. Inc.	Not Taxable
ME	Ded.	All: Ord. Inc.	15% of TYA Tax
MD	Ded.	All: Ord. Inc.	All: Ord. Inc.
MA	Not Ded.	Part (3): Ord. Inc.	All: Ord. Inc.
MI	Ded.	All: Ord. Inc.	Not Taxable
MN	Ded. (6)	Part/All (3): Ord. Inc.	All: MN's TYA
MS	Ded.	All: Ord. Inc.	All: Ord. Inc.
MO	Ded.	All: Ord. Inc.	Not Taxable (14)
MT	Ded.	All: Ord. Inc.	10% of TYA Tax
NE	Ded.	All: Ord. Inc.	All: Ord. Inc.
NV	(1)	(1)	(1)
NH	(13)	(13)	(13)
NJ	Not Ded.	Part (3): Ord. Inc.	All: Ord. Inc.
NM	Ded.	All: Ord. Inc.	All: Ord. Inc.
NY	Ded.	All: Ord. Inc.	All: NY's TYA
NC	Ded.	All: Ord. Inc.	All: Ord. Inc.

Table VI *(Continued)*

State	Contribution by Employee to IRA	Distribution	
		Employee-Sponsored IRA	Employer-Sponsored QRA and TYA Elected
ND	Ded.	All: Ord. Inc.	All: ND's TYA
OH	Ded.	All: Ord. Inc.	All: Ord. Inc.
OK	Ded.	All: Ord. Inc.	All: Ord. Inc.
OR	Ded.	All: Ord. Inc.	All: Ord. Inc.
PA	Not Ded.	All/Part (3): Ord. Inc. (9)	All: Ord. Inc. (9)
RI	Ded.	23.15% of FIT	23.15% of FIT
SC	Ded.	All: Ord. Inc.	SC's TYA
SD	(1)	(1)	(1)
TN	(10)	(10)	(10)
TX	(1)	(1)	(1)
UT	Ded.	All: Ord. Inc.	All: Ord. Inc.
VT	Ded.	26.5% of FIT (11)	26.5% of FIT (11)
VA	Ded.	All: Ord. Inc.	All: Ord. Inc.
WA	(1)	(1)	(1)
WV	Ded.	All: Ord. Inc.	Not Taxable
WI	Ded.	All: Ord. Inc.	All: Ord. Inc.
WY	(1)	(1)	(1)

Table VI *(Continued)*

(1) These states do not have a state income tax.
(2) Deductible since 1982.
(3) Amount included in ordinary income is the distributed amount less nondeducted contributions.
(4) Deduction is limited to individuals who are not active participants in a qualified or government retirement plan or does not contribute to a tax-sheltered annuity at any time during the year for pre-1987 tax years.
(5) Connecticut does not have a state income tax. It does, however, tax capital gains, dividends and interest income.
(6) Deductible since 1985.
(7) The 20% rate is applicable for 1985 tax year.
(8) TYA tax was excluded for pre-1985 tax years.
(9) Title 61 Pa. Code Sec. 101.6(3)(iii) provides special tax forgiveness provisions for distributions received under certain circumstances.
(10) Tennessee does not have a state income tax. It does, however, tax interest from corporate bonds and dividends.
(11) The 26.5% rate is applicable for the 1986 tax year and a 24% rate is applicable for the 1987 tax year.
(12) Not taxable only if the payment is paid for retirement, disability or death. The entire amount is includible if it is received for separation or termination.
(13) New Hampshire does not have a state income tax. It does, however, tax interest and dividends.
(14) Missouri also permits the federal income tax incurred for TYA to be deducted as part of the federal income tax deduction.
(15) Cal. [Taxation] Code Sec. 17112.7 (West 1985).
(16) Amount contributed is deductible even if it is not for federal purposes.
(17) For 1987, the amount contributed is deductible even if it is not for federal purposes.

Table V

INDIVIDUAL INCOME TAX RETURNS: 1987 TAXPAYER FILING STATUS BY AGI CLASSIFICATION

AGI Classifications	Cumulative Percentage by Filing Status: Married Joint Surviving Spouse	Single and Head of Household	Married Separate	Cumulative Percentage by AGI Class
0- 4,999	3.37	25.85	13.65	15.66
5,000- 9,999	10.03	47.91	33.99	30.83
10,000-14,999	19.02	64.10	52.01	43.85
15,000-19,999	28.00	76.37	70.10	54.74
20,000-29,999	46.87	90.01	88.26	70.78
30,000-49,999	77.99	97.85	96.45	88.99
50,000 and above	100.00	100.00	100.00	100.00
Cumulative Percentage by Filing Status	44.52	53.99	1.49	100.00

Source: Internal Revenue Service (Summer 1988, Table 1).

Not all individuals have employment years and retirement years in a single state. Some individuals earn wages in one state, while maintaining a principal residence in another state. Other individuals have a principal residence in more than one state during their employment years. Still other individuals have employment years in one state and retirement years in another state.

For these people, a question arises concerning what portion of their IRA distribution is taxable by which state or states. Also, can the distributed amount be taxed by more than one state? The answer to the latter question is yes.[24] With respect to the former question

> . . . domicile or residence within the state is a valid basis for the imposition of an income tax by the state. It is competent for a state thereof, or a domestic corporation, whether such income be derived from sources within or outside the state. The enjoyment of the privileges of residence within the state and the attendant right to invoke the protection of its laws are inseparable from responsibility for sharing the costs of government, and a tax measured by the net income of residents is an equitable method of distributing the burden of government among those privileged to enjoy its benefits. The tax is founded on the protection afforded by the state to the recipient of the income in his person, in his right to receive the income, and in his enjoyment of it when received, these are rights and privileges which attach to domicile within the state and the economic advantage realized by the receipt of income and the power to control it bear a direct relationship to the rights and privileges attached to domicile and to the equitable distribution of the tax burden.[25]

The state where the taxing authority was deferred may also have taxing authority at the time of distribution.

> . . . The state has power to tax income produced or which has its source in the state. It may tax all income derived from property located within the state and may validly tax such part of the income of a nonresident as is fairly attributable

to property located in the state or to events or transactions which occur within the state.[26]

In October 1988, S 2820 was introduced in Congress to prohibit a state from taxing the pension income of individuals who no longer reside in the state in which their income was originally earned. When the 100th Congress ended, S 2820 had not been passed. This bill was not reintroduced in the 101st Congress. However, similar legislation (HR 1227) with 32 cosponsors has been introduced and was referred to the Committee on the Judiciary. Besides Congress, the Multistate Tax Commission (MTC) (1989, 13-14) through the Uniformity Committee recently took up this issue. The consensus of the committee was that the income should be attributed to the state of residence at the time of plan asset distribution, even if that state does not impose an income tax. No action was taken by the committee as a result of its consensus. Rather, the issue was deferred to the Federation of Tax Administration as the proper organization to take action.[27]

RESULTS OF STUDY

The review of the federal income tax laws pertaining to deductible IRA contributions and the conformity of state income tax laws is the background for this report. At this point, it is apparent that an individual who has claimed domicile or worked in more than one state and who has made a deductible IRA contribution is responsible for filing a state income tax return in some or all of these states when money is withdrawn. Thus the first questions of the report is to determine which states require a nonresident[28] to file a state tax return. To answer this question, three steps were taken in this study. First, the statutory and judicial authority for taxing individual retirement arrangement distributions was reviewed in all states. Second, a questionnaire was sent to each state. The questionnaire posed four taxpayer scenarios. Each scenario represented one of four domicile statuses: (1) resident for entire year, (2) part-year resident where resident at end of year, (3) part-year resident where nonresident at end of year and (4) nonresident for entire year. Responses were received from all but six states with income tax laws.[29] A few of the nonresponding states

either sent tax literature to answer the questions or telephoned their responses. The remaining states were contacted by telephone. Third, each state's tax forms and instructions for residents and nonresidents were reviewed.

Of the 44 states that were queried, 32 states responded that they did not impose an income tax on an IRA distribution to a nonresident. One of the 32 states did indicate that the feasibility of such a tax was under consideration. The remaining 12 states responded that their income tax laws would be imposed on an IRA distribution to a nonresident. Table VII lists the 12 states.

The second question to be answered by this study is what portion of the IRA distribution is taxable in the 12 states. Table VII shows the taxable portion for the taxpayer who is a resident or a nonresident all year (columns 1 and 4, respectively) and for the taxpayer who is or was a part-year resident (columns 2 and 3, respectively).

The tax consequences, not surprisingly, vary among these states and even within these states. Therefore, a review of the pertinent rules within each state is given to reveal the complexity.[30]

California

The basic income tax rule for California residents is that they are required to include in income any IRA distributions that were previously untaxed for California purposes. As previously mentioned, California followed the ERISA rules until 1987, when legislation was signed into law conforming much of the state law to the federal rules (Tax Notes 1987, LL2). Thus, residents covered by an employer-sponsored plan had a federal but not a state tax deduction during this period for their IRA contributions.

Rules are prescribed by the state for determining the untaxed amount of any distribution. Under these rules, nondeductible contributions made prior to 1987 may be recovered in full before including any distributed amount in income. Nondeductible contributions made after 1986 are recovered according to the annuity rules set forth in the Internal Revenue Code.

Individuals who move to California are also subject to the rules

Table VII

AMOUNT OF DISTRIBUTION FROM IRA INCLUDED IN STATE GROSS INCOME BY TAXPAYER'S DOMICILE

States	Resident All Year	Part-Year Resident		Nonresident All Year
		Resident on Year-End	Nonresident on Year-End	
California (1)	Prev. Untaxed (2)	Prev. Untaxed (2) or none	CA Portion	CA Portion
Indiana	Prev. Untaxed	Prev. Untaxed	IN Portion	IN Portion
Iowa	Prev. Untaxed	Prev. Untaxed	IA Portion	IA Portion
Kansas	Prev. Untaxed	Prev. Untaxed	KS Portion	None
Kentucky	Prev. Untaxed	Prev. Untaxed	KY Portion	KY Portion
Louisiana	Prev. Untaxed	Prev. Untaxed	LA Portion	None
Michigan	Prev. Untaxed	Prev. Untaxed	MI Portion or none	MI Portion or none (3)
Mississippi	Prev. Untaxed	Prev. Untaxed	MS Portion	None

for residents. As a result, an arbitrage profit may be enjoyed by such taxpayers. That is, all contributions made prior to 1987 while such taxpayers were domiciled in another state are considered nondeductible contributions to California. Thus, taxpayers take as basis in IRA distributions the pre-1987 contributions. These amounts may be withdrawn tax free for California tax purposes. This tax rule puts the relocating taxpayer on an equal footing with lifetime residents of California. The arbitrage profit, if any, results from the taxpayer's former state. That is, if the former state permitted a deduction for the taxpayer's contributions and does not require tax recapture of distributions to nonresidents, then the taxpayer enjoys a double benefit at the state tax level (deduction in former state and no tax in current state).

Individuals who leave California and claim domicile elsewhere, or who earn income in California but claim domicile elsewhere, are still subject to California tax. These nonresidents of California may pay tax at two state levels: their current state of domicile and California. Moreover, the tax is a pro-rata share of California source income to total income. Thus, the deferred earnings of the IRA also are subject to California state income tax.

Indiana, Iowa, Kentucky, Montana and Utah

These five states have statutory provisions that tax IRA distributions in a consistent manner for part-year residents and nonresidents. In essence, the taxpayer must include the pro-rata share of the distribution that was previously untaxed by the state corresponding to the state's source income to total income.

Kansas, Louisiana and Mississippi

These three states distinguish the state tax liability of a part-year resident who is a nonresident at year-end from that of a nonresident. The part-year resident must include the pro-rata share of the IRA distribution that corresponds to the state's source income from total income (column 3, Table VII). The nonresident, on the other hand, does not need to file a tax return. In other words, the distribution is not subject to tax (column 4, Table VII).

Michigan and Oregon

Michigan and Oregon have modified tax provisions in comparison to the other nonresident taxing states. Oregon taxes the deferred compensation portion of the distribution but does not tax the earnings portion.[31] Thus, Oregon simply recaptures the tax benefits that it provided previously to the taxpayer in the contribution year.

Michigan, however, has three unique provisions. First, any distribution received by a part-year resident or nonresident who is a resident of a state with a reciprocal agreement[32] with Michigan is exempt from the Michigan state tax on IRA distributions. This exemption is valid even if the taxpayer receives a premature distribution. Michigan defines *premature distribution* to be any amount withdrawn before reaching age 59½.

Second, a part-year or nonresident who claims domicile in a nonreciprocal state is exempt from the Michigan tax only if the distribution qualifies as a pension or retirement benefit (i.e., distributions other than premature distributions). A nonqualifying pension or retirement benefit (i.e., a premature distribution to a nonresident in a nonreciprocal state) is subject to Michigan tax. As in other states, the amount subject to tax is the portion that reflects contributions and earnings up to the date of domicile change.[33]

Third, a nonresident who claims domicile in a nonreciprocal state, but who earns income in Michigan, is subject to tax on the deferred compensation. Michigan does not tax the accrued interest in this case.

New York

The New York tax law requires nonresidents to include in New York adjusted gross income the portion of an IRA distribution that is attributable to services performed in the state.[34] Regulation Sec. 131.20 states in part:

> . . . If a pension or other retirement benefit does not qualify as an annuity under subdivision (d) of section 131.4 of this Part, and is attributable to services performed wholly within New York State, the entire amount included in the individ-

> ual's Federal adjusted gross income is likewise includible in his New York adjusted gross income. If the pension or other retirement benefit is attributable to services performed wholly outside New York State, no part of the amount received is includible in the individual's New York adjusted gross income. Where the employee's services were performed partly within and partly without New York State, the amount includible in the individual's New York adjusted gross income is the proportion of the amount included in the individual's Federal adjusted gross income which the total compensation, received from the employer for the services performed in New York State during a period consisting of the portion of the taxable year prior to retirement and the three taxable years immediately preceding the retirement, bears to the total compensation received from the employer during such period for services performed both within and without New York State.

New York also permits nonresident taxpayers, if over 59½ years of age, to exclude annually part or all of their IRA distributions.[35] The annual exclusion amount is the lesser of $20,000 or the portion of $20,000 as it bears to the New York attributable amount of the IRA distribution.[36]

A caveat must be added in the case of a part-year resident who at year-end claims domicile in New York. Any amount withdrawn during the part-year status may be included or exempted from New York adjusted gross income. The determining factor is the taxpayer's residency status at the time the withdrawal is arranged.[37] That is, if a part-year resident arranges the withdrawal after becoming a New York resident, the distribution is included as income earned outside the state. If, on the other hand, the withdrawal is arranged before the taxpayer becomes a New York resident, then the New York portion attributable to the nonresident is zero and, therefore, exempt.[38]

Summary of States

The analysis of the 41 states with state income tax laws revealed that 12 states (29%) have income tax provisions for IRA distributions

to part-year residents and/or nonresidents. As the review of the 12 states suggests, the tax provisions for nonresidents and part-year residents vary among states. Requirements in some states that the state tax on IRA distributions reflect state source income mean that taxpayers must maintain tax records from at least 1974. Tracking income to each state is reasonable and feasible on an annual basis, but it is likely to be impossible over a person's career. Taxpayers, generally, do not maintain 20-40 years of tax returns and supporting material. Such extensive records appear to be required of former residents of many states. New York, however, provides a simplifying method for determining the includible portion of a distribution where the employee's services were partly within and partly without the state. The simplifying method allows the pro-rata share to be based on the prior three or more years from retirement.[39]

PROPOSED TAX PROVISIONS

The analysis of state income tax laws in connection with IRA distributions suggests that taxpayers who change domicile may be required to file a nonresident tax return in some or all states where they previously lived or had earnings. Taxpayers who attempt to comply with the state laws may be frustrated by the nonconformity among states, by the complexity of the allocation rules and by the documentation needed. Moreover, an error in computing one state's allocated share will more than likely affect the computation of at least one other state's allocated share. On the other side, state treasury departments, as well as state auditors, face similar problems in determining whether the correct tax amount is paid.

A resolution to this dilemma may come forth from Congress or from the states themselves. However, before a resolution can be given, alternatives need to be examined. This section presents an alternative for comprehensive tax equity among taxpayers within states.

This alternative centers on the year in which a person changes domicile. As a result, only two states are involved for the taxpayer and for the state agencies: the former state of domicile and the current state of domicile. These two states exhibit two dichotomous characteris-

Figure 2

STATE CHARACTERISTICS FOR TAXPAYERS WHO CHANGE DOMICILE

Taxpayer Case	Former State			Current State		
	Income Tax	IRA Deduction		Income Tax	IRA Deduction	
1	Yes	Yes	(a)	Yes	Yes	(a)
2	Yes	Yes	(a)	Yes	No	(b)
3	Yes	Yes	(a)	No	No	(c)
4	Yes	No	(b)	Yes	Yes	(a)
5	Yes	No	(b)	Yes	No	(b)
6	Yes	No	(b)	No	No	(c)
7	No	No	(c)	Yes	Yes	(a)
8	No	No	(c)	Yes	No	(b)
9	No	No	(c)	No	No	(c)

Notes: Each state is classified as (a), (b) or (c) as follows:

(a) Alabama, Arkansas, Arizona, California, Colorado, Delaware, District of Columbia, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Virginia, West Virginia and Wisconsin.

(b) Massachusetts, New Jersey and Pennsylvania.

(c) Alaska, Connecticut, Florida, New Hampshire, Nevada, South Dakota, Tennessee, Texas, Washington and Wyoming.

tics. The first characteristic is that the state either has an income tax or it does not have an income tax. The second characteristic is that a state either permits a deduction for an IRA contribution or it does not. Therefore, taxpayers theoretically fall into one of 16 possible cases by changing domicile. Under current state tax laws, no state permits a tax credit (i.e., a negative state income tax) for an IRA contribution when the state does not have an income tax. Therefore, only nine possible cases are feasible. The nine cases are shown in Figure 2. To il-

lustrate, a taxpayer who moves from a state with an income tax that permits an IRA deduction to a state with an income tax that does not permit an IRA deduction would fall into case 2 (see Figure 2).

The state tax rule proposed here has two parts. First, a taxpayer must recapture any IRA deductions permitted by the former state while the taxpayer was a resident of the former state in the year of domicile change. Second, the taxpayer, upon establishing domicile, will be allowed a deduction for any previous IRA contributions that would have been deducted had the taxpayer always been a resident of the current state. The objective of both provisions is to allow taxpayers entering a state to receive the same tax benefits as any other resident of the new state and, at the same time, allow the former state to reclaim tax benefits awarded the taxpayer leaving the state. Interest and earnings accrued in the IRA will be taxed under this provision only when funds are removed from it. As a result, when a distribution is made only the state of domicile will be able to tax the interest and earnings.

As an example, taxpayers A and B file as married joint for federal tax purposes. Both spouses have earned income and contributed $20,000 over the past six years to their respective IRAs. Of the $20,000 contributed, $17,000 was deducted for federal tax purposes. In 1989, an additional $3,000 was contributed to the IRA, bringing the contributions to date to $23,000. These facts are summarized in Table VIII.

Taxpayers A and B establish domicile in another state in 1989, before they filed their 1988 tax returns. An analysis of the state tax effect that would result from the move under the proposed provision is given for the different cases.

Case 1

In the first case, taxpayers A and B moved from a state with a tax and an IRA deduction to a state with the same characteristics. Taxpayers A and B would claim $17,000 of income on the 1988 part-year tax return of the former state and deduct the same amount in the current state. This would provide A and B with the same state tax basis in the current state as any other resident who contributed $20,000 of

Table VII *(Continued)*

States	Resident All Year	Part-Year Resident		
		Resident on Year-End	Nonresident on Year-End	Nonresident All Year
Montana	Prev. Untaxed	Prev. Untaxed	MT Portion (4)	MT Portion
New York	Prev. Untaxed	Prev. Untaxed	NY Portion (5)	NY Portion (5)
Oregon	Prev. Untaxed	Prev. Untaxed	OR Def. Comp. Portion	OR Def. Comp. Portion
Utah	Prev. Untaxed	Prev. Untaxed	UT Portion	UT Portion

Notes: Prev. = Previous Def. = Defined.

(1) Premature distribution (i.e., before age 59½) is fully taxable.

(2) In California, the term *previously untaxed* applies to residents and nonresidents equally.

(3) The Michigan portion will depend if the individual was a nonresident working in Michigan or if the individual was a resident of Michigan who changed domicile.

(4) Montana allows a $3,600 annual exclusion.

(5) New York allows a pro-rata share of a $20,000 annual exclusion.

which $17,000 was deducted for federal purposes. Likewise, A and B would have returned to the former state any tax benefits received.

The net tax benefit or net tax cost to A and B will depend on the tax rates of the respective states. If, for example, the former state has a higher tax rate, A and B will have a net cost. Similarly, if the former state has a lower tax rate, they will have a net savings. The taxpayer, however, will not be violating the former state income tax laws whenever a withdrawal is made from the IRA.

With respect to the states, the former state is made whole by recovering tax revenues associated with the previously permitted IRA deductions. That state does not wait until the former resident makes an IRA withdrawal to recover the deferred taxes. The current state, on the other hand, incurs a loss of revenue. That is, the current state will give a tax payment to the new resident so that tax equality with other residents is achieved.

Cases 2 and 3

In both of these cases, A and B are moving from a state with a tax and an IRA deduction to a state that does not permit a deduction for an IRA contribution. A and B would claim $17,000 of income on the 1988 part-year return of the former state. This payment, as in case 1, corresponds to the tax benefits received from the former state when the contributions were made. There is no corresponding deduction permitted the taxpayer in the current state, since none is permitted or there is no state income tax. Although this appears to be a harsh result, the fact is that A and B are no better off and no worse off than any other resident of the current state. In fact, one could argue that they are better off since they had the advantage of accruing IRA earnings with pre-state tax dollars. Lifelong residents of the current state have not received a state tax subsidy for their contributions. Thus, their total IRA investment may be less than taxpayers A and B. Also, when A and B withdraw funds from the IRA at a later date, the amount will be given the same tax treatment as any other resident under this provision. That is, none of the distribution will be subject to state tax

for case 3 and none of the previously untaxed portion will be subject to state tax for case 2.

Cases 4 and 7

These two cases are the opposite of cases 2 and 3, respectively. The former state does not allow a deduction (case 4) or the former state does not have an income tax (case 7). As a result, no recapture of previous IRA deductions by A and B is necessary. But the taxpayers are permitted a deduction of $17,000 by claiming domicile in the current state. This amount corresponds to the amount that would have been deducted if they always had been a resident of the current state.

Cases 5, 6, 8 and 9

These four situations require no adjustment for the taxpayer in either the former or current state. The reason is simple: The state either does not have an income tax (cases 8 and 9) or it does not permit a deduction (cases 5 and 6).

Unresolved Issues of Proposed Provision

The proposed uniform tax provision purports to place taxpayers on an equal basis with other taxpayers in the state of current domicile. In addition, taxpayers would not be required to file a tax return as a nonresident in later years when they withdraw some or all of their IRA holdings. Finally, states would not be burdened with searching for taxpayers who have relocated and fail to file when they withdraw their IRA assets.

Needless to say, there are unresolved issues to the tax provision. First, a uniform state tax act would be needed. Second, tracking previously made deductions would still be a problem for taxpayers. The tracking would be limited to the years prior to the change in domicile. Third, states that currently tax nonresidents on the pro-rata share of the IRA withdrawals (i.e., the earnings portion) would give up this revenue. This provision limits the recapture to the tax benefits provided. Fourth, states with income tax laws and IRA provisions will sustain

annually a net revenue benefit or a net revenue loss as a result of state migration behavior of their citizens making IRA contributions. In those years in which the state experiences a net immigration, the state will experience a decrease of tax revenues. Fifth, the IRA deduction will be limited to residents of a state. Thus, nonresidents who earn income will not be permitted a deduction for any IRA contribution when filing a nonresident return. Sixth, the ability of a taxpayer to pay the recapture tax to the former state may present a financial problem. If the former state has a tax rate that is greater than the current state, the tax savings of the new state will not offset the recapture tax. Likewise, if the new state does not have an income tax or does not permit the deduction of an IRA contribution, the taxpayer receives no tax savings but still has the recapture tax to pay. One possible solution would be to permit the taxpayer to invade the IRA for the excess amount without being assessed any federal tax or penalties. The *excess amount* would be defined as the recapture state tax amount less the tax savings from the new state.

LIMITATIONS TO STUDY

This study concentrated on the state income tax issue of IRA distributions to nonresidents. In the course of the analysis, IRA issues, as they pertained to residents of the states, were also considered. The study, however, does not address the overall issue of deferred compensation to residents and especially nonresidents. As this study and prior studies indicate, the area is complex, and further research is needed.

SUMMARY

Historically, most state income tax laws have conformed with the federal income tax laws. Such conformity may be appropriate for achieving a sound tax policy[40] when the income tax laws of states are identical and, more importantly, when wage earners rarely relocate from one state to another. When either of these two conditions is violated, conformity with federal income tax laws may not always be beneficial to states or to individuals.

IRAs were initially legislated in 1974 by Congress for wage earn-

ers who are not covered by employer-sponsored plans. Congress broadened the availability of IRAs in 1981 to all wage earners. Five years later, legislation was passed to restrict the deductibility of an IRA contribution to wage earners who are not covered by an employer-sponsored plan or to wage earners who have an AGI amount below a specified amount.

Regardless of the uncertain status of IRA availability, taxpayers may face a more difficult challenge at the state tax level when money is removed from the IRA. That is, taxpayers who have changed domicile after making state tax deductible IRA contributions may be required to file a nonresident tax return to the former state or states when they withdraw IRA funds.

An analysis of the 43 states with state income tax laws and the District of Columbia revealed that 12 states currently have tax provisions to tax IRA distributions of former residents. The 12 states are California, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Montana, New York, Oregon and Utah. In addition to these 12 states, at least one other state indicated that such a tax is under consideration.

Although bills have been, and are, proposed in Congress to limit state income tax on retirement income to residents, state treasuries will lose the ability to recapture previously awarded tax benefits. Thus, a uniform tax provision is presented in this report to establish tax equality among taxpayers within a state. The provision has the added feature of allowing states to recapture state tax benefits awarded IRA contributions of former residents when domicile is changed.

ENDNOTES

1. Participation in employer- or union-provided pension plan coverage for full-time workers did exceed the 50% level during the 1980s (see Table II). However, Table II also shows that participation rates for all workers (full-time and part-time) are well below the 50% level.

2. HR Report No. 779 at 125.

3. Sec. 2002(a), Employee Retirement Income Security Act of 1974, P.L. 93-406, 9/2/74.

4. HR Report No. 779 at 126.

5. IRC Sec. 402(e)(1).

6. Act Sec. 1122(h)(3) of P.L. 99-514, 10/22/86.

7. See, e.g., Samson (1981), Samson and Robbins (1985) and Curatola (1986, 1987).

8. Thirty-seven states and the District of Columbia permit the deduction of IRA contributions. Of the 37 states, Arkansas, California and Georgia will differ for some years with the amount that is deductible for federal income taxes. Massachusetts, New Jersey and Pennsylvania do not conform to the federal tax law for IRAs and, thus, no deduction for IRA contributions is allowed. See, e.g., Curatola (1986).

9. *Basis* is the value of IRA investment that reflects the posttax contribution amount.

10. For purposes of the report, the District of Columbia is considered a state; there is a total of 51 states.

11. ERISA, ERTA and TRA '86 stand for Employee Retirement Income Security Act of 1974, the Economic Recovery Tax Act of 1981 and the Tax Reform Act of 1986, respectively. These three periods correspond to tax laws that significantly affected the eligibility requirements for IRA participation.

12. IRC Sec. 408 which was added by Sec. 2002(b) of P.L. 93-406, 9/2/74.

13. IRC Sec. 219 was added by Sec. 2002(a) of P.L. 93-406, 9/2/74. The term *Internal Revenue Code* is used throughout this report to mean the Internal Revenue Code of 1954, as amended for pre-TRA '86 law, and the Internal Revenue Code of 1986, as amended for TRA '86 law and thereafter.

14. For 1972, only data for full-time workers was found.

15. HR Report No. 97-201 at 132.

16. See, e.g., Bosworth (Tax Notes 1989a, G-6).

17. Debate on the appropriateness for the tax system to increase emphasis on individual savings initiatives, like individual retirement accounts, rather than employer-sponsored retirement plans, can be found in Tax Reform Proposal—XIII (1985, 1-58).

18. IRC Sec. 219(g), which was added by Sec. 1101(a)(1) of P.L. 99-514, 10/22/86, limits the deduction for active participants in certain plans. In general, the deductible amount for an IRA is reduced to zero for active participants and spouses with adjusted gross income amounts in excess of $50,000 in the case of a taxpayer filing a joint return, in excess of $10,000 in the case of a married taxpayer filing separate, and in excess of $35,000 in the case of all other taxpayers. A partial IRA de-

duction is provided in the case of a taxpayer filing a joint return with an AGI between $40,000 and $50,000 and in the case of other taxpayers with an AGI between $25,000 and $35,000.

19. This category did not have a breakdown for $25,000 or $35,000. As a result, the $30,000 cutoff was used as a conservative estimate.

20. Section 4981A was redesignated as Section 4980A by Section 1011A(g)(1), Technical and Miscellaneous Revenue Act of 1988, P.L. 100-647, 11/10/88.

21. IRC Sec. 4980A(c)(1).

22. IRC Sec. 4980A(c)(4).

23. Cal. Rev. & Tax. Code Ann. Secs. 17501, 17507 and 17508 (West 1985) and GA. Code Ann. Sec. 48-7-27 (Michie 1984).

24. An in-depth discussion on this issue can be found in Hellerstein (1974) and Brown (1936).

25. Mack and Kiser, 85 C.J.S. Taxation Sec. 1090.b. (1954).

26. *Ibid.* The reader should realize that the state's taxing authority provided herein is not intended as a treatise on the subject.

27. S 2820, HR 1227 and the MTC address the state taxation of retirement income of nonresidents. As such, they address QRAs as well as IRAs.

28. The term *nonresident* is used throughout the remainder of this report to mean an individual who either claimed domicile in another state or worked in another state and was required on those occasions to file a tax return in that state.

29. Questionnaires were not sent to the seven states that do not impose a state income tax law.

30. The following state review is arranged alphabetically. If several states are discussed in a subsection, the lead state was used for the arrangement order. The author is especially grateful to these state tax representatives and their staffs for their assistance and for the information.

31. Subsec. (2)(c) of OR. Admin. R. 150-316.127 (1988). This administration rule provides an extensive discussion of Oregon's tax, including examples of tax consequences for Oregon nonresidents.

32. See Mich. Comp. Laws Sec. 206.256(3) and Rev. Admin. Bull. 1988-22.

33. Rev. Admin. Bull. 1988-22.

34. 1987 N.Y. Tax Law Sec. 632(a) and (b) and TSB-A-86-(3)-I.

35. 1987 N.Y. Tax Law Sec. 632(a)(2).

36. TSB-M-81-(19) Rev-I.

37. Residency and domicile vary among states. For a discussion on domicile, see Josephs (1981) and Hagendorf (1981).

38. This problem could, conceivably, exist in other states with income tax laws.

39. 20 NYCCR 131.20 provides in part:

> . . . Where the employee's services were performed partly within and partly without New York State, the amount includible in the individual's New York adjusted gross income is the proportion of the amount included in the individual's Federal adjusted gross income which the total compensation, received from the employer for the services performed in New York State during a period consisting of the portion of the taxable year prior to retirement and the three

taxable years immediately preceding the retirement, bears to the total compensation received from the employer during such period for services performed both within and without New York State. For purposes of this section, the compensation for services performed within New York State must be determined separately for each taxable year or portion of a year in accordance with the applicable provisions of section 131.17, 131.18 or 131.19 of this Part. A determination of the portion of a pension or other form of deferred compensation attributable to New York State on the basis of a period of time greater than the period referred to above may be made if the individual establishes, to the satisfaction of the Tax Commission, the amount of his total yearly compensation for a longer period of time and the amount allocable to New York State in each year in accordance with the applicable provisions of section 131.17 through 131.19 of this Part. 20 NYCRR 131.20.

40. See, for example, chapter 3 of Klein (1976) for an overview of the criteria for sound tax policy.

REFERENCES

Brown, Robert C. 1936. "Domicile v. Situs as the Basis of Tax Jurisdiction." *Indiana Law Journal* 12, no. 2 (December): 87-103.

Committee on Finance, United States Senate. 1986. HR Report No. 99-313 to accompany HR Doc. No. 3838, 99th Congress, 2nd Session. May 29.

Committee on Ways and Means, United States House of Representatives. 1974. HR Report No. 93-779 to accompany HR Doc. No. 12481, 93rd Congress, 2nd Session. February 5.

———. 1981. HR Report No. 97-201. Tax Incentive Act of 1981 to accompany HR Doc. No. 4242, 97th Congress, 1st Session. July 24.

Curatola, Anthony P. 1986. *State Income Tax Consequences of Retirement Plan Distributions.* Research Report 86-5. Brookfield, Wisconsin: International Foundation of Employee Benefit Plans.

———. 1987. "Retirement Plan Distributions and Federal/State Income Tax Equality." *Tax Notes,* 23 February, 817-821.

DeMagistris, Robin, and Carl Palash. 1982-1983. "Impact of IRAs on Savings." *Federal Reserve Bank of New York Quarterly Review* 7 (Winter): 24-32.

Economic Recovery Tax Act of 1981, HR Doc. No. 4242, 97th Congress, 1st Session.

Employee Retirement Income Security Act of 1974, HR Doc. No. 2, 93rd Congress, 1st Session.

Hagendorf, Stanley. 1981. "How to Avoid Problems of Domicile where a Client has Ties to Two or More States." *Estate Planning,* July, 208-213.

Hellerstein, Walter. 1974. "Some Reflections on the State Taxation of a Nonresident's Personal Income." *University of Michigan Law Review* 72, no. 7 (June): 1309-1354.

House of Representatives. 1986. Conference Report 99-841 to accompany HR 3838, 99th Congress, 2nd Session. September 18.

———. 1989. HR 1227, 101st Congress, 1st Session.

Hubbard, Glenn R. 1984. "Do IRAs and KEOGHs Increase Savings?" *National Tax Journal* 37, no. 1 (March): 43-54.

Internal Revenue Code of 1954, as amended.

Internal Revenue Code of 1986, as amended.

Internal Revenue Service. *Individual Income Tax Returns: Statistics of Income.* Various annual editions. Washington, D.C.

———. *Statistics of Income Bulletin.* Various quarterly editions. Washington, D.C.

Joint Committee on Taxation. 1985. *Tax Reform Proposals: Pensions and Deferred Compensation.* (JCS-33-85). August 5.

Josephs, Gary S. 1981. "A Checklist for Determining Domicile." *The Practical Lawyer* 27, no. 5 (July 15): 55-61.

Klein, William A. 1976. *Policy Analysis of the Federal Income Tax: Text and Readings.* Mineola, New York: The Foundation Press.

Mack, William, and Donald J. Kiser, eds. 1936-1983. *Corpus Juris Secundum.* Brooklyn: American Law Book Co. and West Publishing Co.

Multistate Tax Commission. 1989. "Uniformity Committee Activities—Pensions." *Multistate Tax Commission Review* 1989, no. 1 (March).

O'Neil, Cherie J., and G. Rodney Thompson. 1987. "Participation in Individual Retirement Accounts: An Empirical Investigation." *National Tax Journal* 40, no. 4 (December): 617-624.

Samson, William D. 1981. "Conforming the North Carolina Individual Income Tax to the Federal Income Tax: An Empirical Examination of the Shifts in Tax Burden." Unpublished Ph.D. dissertation. University of North Carolina at Chapel Hill.

Samson, William D., and Walter A. Robbins. 1985. "Impact of Reagan Proposal on State Corporate and Individual Income Taxes." *Journal of State Taxation* 4 (Fall): 201-223.

Senate. 1988. S 2820. 100th Congress, 2nd Session. Sec. 1.

Smith, Robert Vincent. 1986. New York State Tax Commission Advisory Opinion. TSB-A-86-(3)-I. March 6.

Tax Notes. 1987. "State Developments—California." *Daily Tax Report,* no. 275, October 2.

Tax Notes. 1989a. "CBO Official says Reliance on Payroll Tax Lessening Progressivity of Tax System." *Daily Tax Report,* no. 75, April 20.

Tax Notes. 1989b. "Ways and Means Hearing Told Tax Break for IRAs May Have Improved Savings Rate." *Daily Tax Report,* no. 76, April 21.

Tax Reform Act of 1986, HR Doc. No. 3838, 99th Congress, 2nd Session.

Tax Reform Proposal—XIII: Hearings Before the Committee on Finance, United States Senate. 1985. S. Hrg. 99-246, Pt. XIII. 99th Congress, 1st Session. 1-58. July 11.

Technical and Miscellaneous Revenue Act of 1988. HR Doc. No. 3342. 100th Congress, 2nd Session.

U.S. Department of Commerce, Bureau of the Census. 1973. *Coverage and Vesting of Full-Time Employees Under Private Retirement Plans: Findings From the April 1972 Survey.* September. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of the Census, Current Population Reports. Series P-60, no. 148. *Characteristics of Households and Persons Receiving Selected Noncash Benefits: 1983.* Washington, D.C.: U.S. Government Printing Office.

_____. Series P-60, no. 131, *Characteristics of Households and Persons Receiving Selected Noncash Benefits: 1980.* Washington, D.C.: U.S. Government Printing Office.

_____. Series P-60, no. 155. *Receipts of Selected Noncash Benefits: 1985.* Washington, D.C.: U.S. Government Printing Office.

Table VIII

	Contributions	Federal	Amount of IRA Deductions		
			Income Tax States		No Income Tax States
			(IRA Ded.)	(No IRA Ded.)	
1983	$ 4,000	$ 4,000	$ 4,000	$0	$0
1984	4,000	4,000	4,000	0	0
1985	3,000	3,000	3,000	0	0
1986	3,000	3,000	3,000	0	0
1987	3,000	3,000	3,000	0	0
1988	3,000	0	0	0	0
1989	3,000	*	*	*	*
	$23,000	$17,000	$17,000	$0	$0

*No tax return is filed because tax year is not over.